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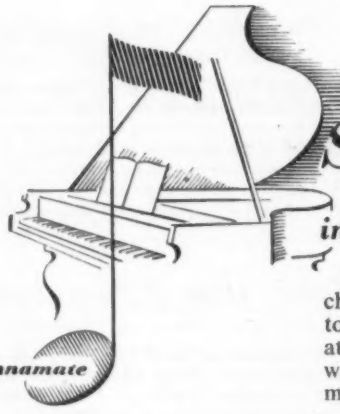

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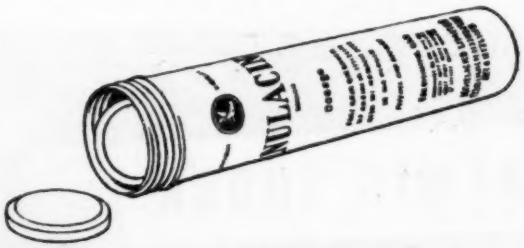

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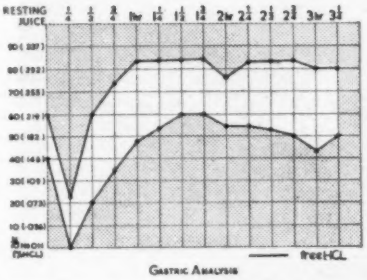

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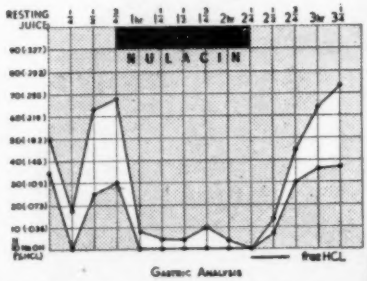

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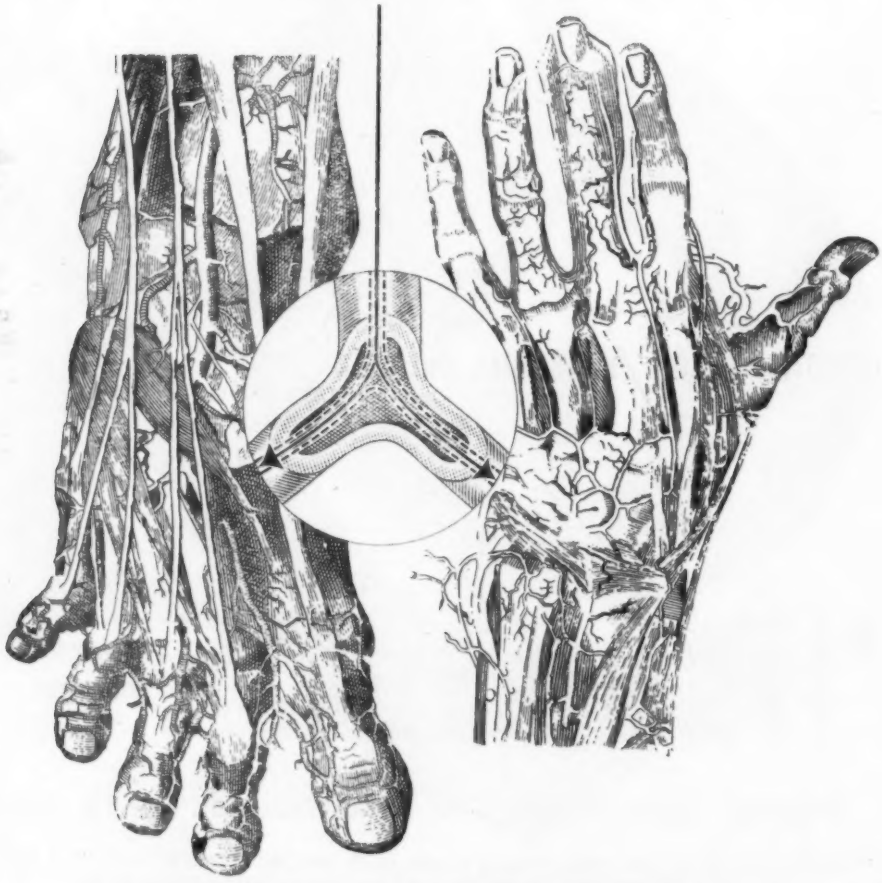

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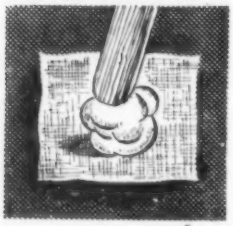

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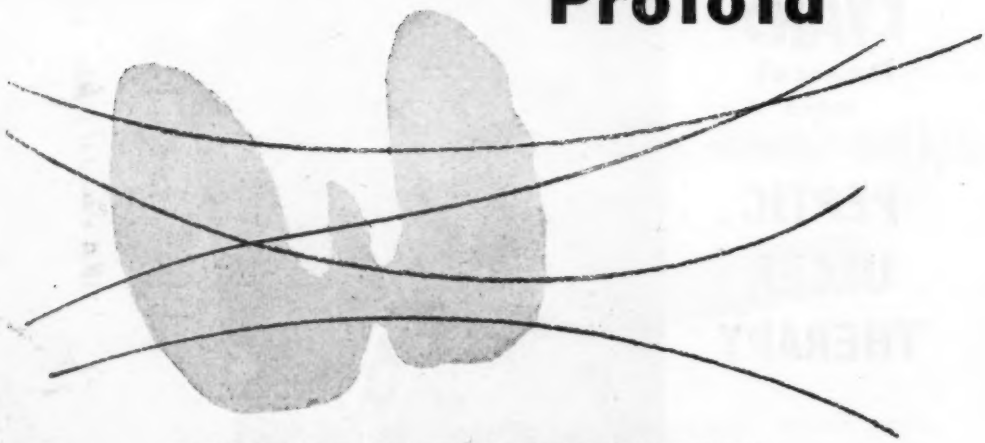

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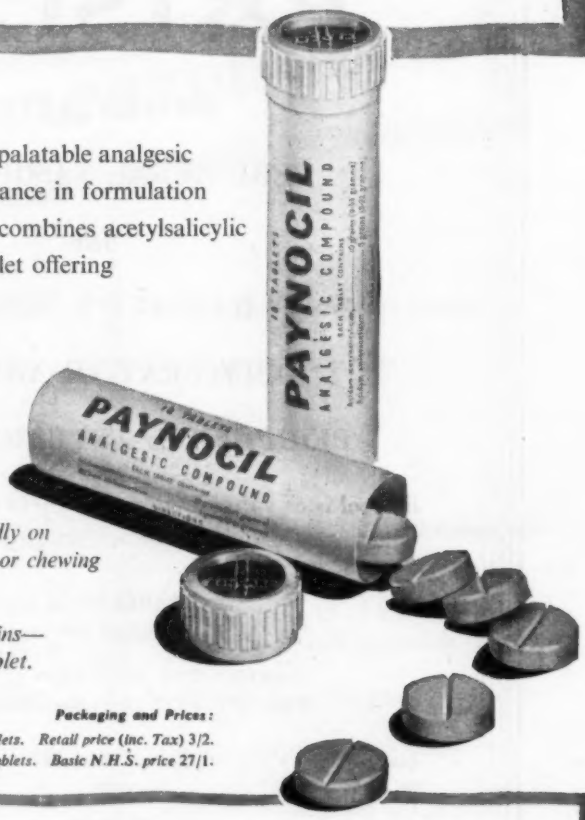

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ENDOCRINE RELATIONS *

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THE most important task in clinical endocrinology is to determine the various hormonal balances which maintain day-to-day, indeed hour-to-hour, endocrine homœostasis. We have ample opportunity for studying these mechanisms in common and familiar pathological endocrine states, both of excess and of deficiency. We shall make little progress in understanding the highly complicated changes by which the body adapts itself to those various situations which it is fashionable today to call "stress" until these long-standing gross derangements are elucidated. These problems must be solved in man, and here we have an opportunity denied to the physiologist experimenting on animals in that these endocrine disorders are often partial rather than complete, selective rather than total, of slow unfolding rather than of sudden onset, and of long rather than short duration.

Investigations

The 9 patients considered here were all investigated by the usual diagnostic methods, but I wish to emphasise here the value of three investigations: the estimation of urinary 17-ketosteroids; the water-load test; and the use of hormones—corticotrophin, cortisone, and thyroid—to elucidate endocrine mechanisms.

Urinary excretion of 17-Ketogenic Steroids

The urinary 17-ketogenic steroids were estimated by the method which was first published by Norymberski (1952) and was the subject of a clinical report by Norymberski et al. (1953). By this method the urinary 17-ketosteroids are estimated first, and then the "total" 17-ketosteroids are estimated after treating the urine with sodium bismuthate, which oxidises a group of corticosteroids including the important 17-α hydroxycorticosterone (hydrocortisone). The subtraction of the first result from the second gives the measure of the 17-ketogenic steroids.

Six hundred of these assays have been done for me in the endocrine laboratory at the Jessop Hospital for Women, Sheffield, and I am satisfied that the claims made for this method by Norymberski et al. are well justified. The urinary excretion of 17-ketogenic steroids is the most accurate index of adrenocortical activity that can at present be provided by routine laboratory investigation. The normal output of 17-ketogenic steroids is 10–20 mg. per 24 hr. in men and 5–15 mg. per 24 hr. in women.

Water-load Test

Many variants of the water-load test have been described, and although I have used them I have preferred the method described by Robinson et al. (1941) and called Kepler I—a posthumous tribute to a fine endocrinologist. Kepler I is here modified in that no comparison is made between the night-volume of urine and the hourly collections, but in all other respects the method is unchanged. Dr. Oliver Garrod tells me that he regards the lower limit of normal excretion as 5 ml. in the second hour, and 70% excretion of the total load during the first three hours.

The water-load response is deficient in heart-failure, in disease of the liver and kidney, in steatorrhœa, in ulcerative colitis, and as I shall show, in myxœdema. It is necessary to eliminate these diagnoses before attributing a defective response to adrenocortical failure. The fact that a defective water-load response due to adrenocortical deficiency can be corrected with cortisone (Garrod and Burston 1952) may be used to confirm the diagnosis. The water-load response is by far the most sensitive ward test of adrenocortical function and correlates well, as I have many times proved, with the output of 17-ketogenic steroids.

Hormones

I have used corticotrophin and cortisone extensively and need not emphasise how important these hormones are as research tools in endocrinology.

Hyperpituitarism

The clinical value of the Norymberski test for urinary 17-ketogenic steroids is particularly notable in hyperpituitary states. Though we have several useful tests for hypopituitarism, we have no single objective assessment of hyperpituitarism that is simple, accurate, and direct.

In cases 1 and 2 the onset of diabetes and that of thyrotoxicosis apparently coincided.

Case 1.—A spinster postwoman, aged 45, complained of thirst, polyuria, loss of weight, and fatigue for six months; the fatigue and loss of weight preceded the thirst and polyuria. Her paternal grandfather had been diabetic. She had diabetes, and it was thought that she had thyrotoxicosis also. This latter diagnosis was confirmed by a radio-iodine plasma-activity test before admission to hospital. Forty-eight hours after a tracer dose of 25·9 μC of I^{131} had been given the total plasma activity was 3·64% of the dose per litre of plasma and the protein-bound activity was 3·71% of the dose per litre—results well inside the thyrotoxic range (Goodwin et al. 1951).

Treatment.—The diabetes was first controlled. The insulin requirements were reduced from 28 units of soluble and 28 units of protamine zinc insulin at the end of the first week to 16 units of soluble and 14 units of protamine zinc insulin at the end of the third week. Methyl thiouracil therapy was then started in a dose of 0·2 g. twice daily. The insulin needs continued to fall; and, when the thyrotoxicosis was controlled at the end of a further fortnight, the dose of insulin was soluble 4 units and protamine zinc insulin 4 units. At the end of a further six weeks the patient became myxœdematous and the thiouracil was stopped, and in the subsequent seven months there has been no need to give it again. Her insulin needs are now 4 units of soluble and 10 units of protamine zinc insulin.

Urinary excretion of 17-ketogenic steroids.—Before the start of thiouracil therapy the urinary output of 17-ketosteroids was 16 mg. per 24 hr. and of 17-ketogenic steroids 22 mg. per 24 hr. During thiouracil therapy the urinary excretion of 17-ketosteroids was 12 mg. per 24 hr. and of 17-ketogenic steroids 16 mg. per 24 hr. Four months after the end of thiouracil therapy the urinary output of 17-ketosteroids was 16 mg. per 24 hr. and of 17-ketogenic steroids 28 mg. per 24 hr. A month later the urinary output of 17-ketosteroids was 15 mg. per 24 hr. and of 17-ketogenic steroids 32 mg. per 24 hr.; and six months later the urinary output of 17-ketogenic steroids had increased to 48 mg. per 24 hr.

Follow-up.—There is still neither sign nor symptom of hypercorticism. Recent repeated radio-iodine studies of thyroid uptake and of plasma activity have shown that the patient is still thyrotoxic according to these tests, although there is no clinical evidence of it.

Case 2.—A married woman, aged 30, with one son aged 6. Ten weeks before her admission to hospital the boy was ill with scarlet fever. She nursed him through this illness and became very tired, disinterested, and inert. Six weeks before admission she developed a quinsy, and after this illness she had palpitation and nervousness and lost weight.

On admission she was acutely ill with thyrotoxicosis, auricular fibrillation, an enlarged heart, and diabetes.

Treatment.—She was treated with methyl thiouracil, thyroid, and iodine. The cardiac rhythm became regular on the sixth day of treatment, and on the seventh day there was a diuresis of 130 oz. Four days later the apex-beat had moved in from $4^1/_2$ to $3^1/_2$ inches from the mid-sternal line, and the harsh apical systolic murmur disappeared. The

* Based on a lecture delivered at the Postgraduate Medical School of London on June 18, 1954.

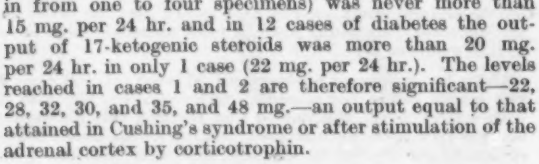
glucose-tolerance curve was still of diabetic type ten days after admission, and treatment with insulin was started on the sixteenth day. At the end of a week her insulin needs were 48 units of soluble and 38 units of protamine zinc insulin. Sixteen days after admission the urinary excretion of 17-ketosteroids was 5 mg. per 24 hr. and of 17-ketogenic steroids 30 mg. per 24 hr., and during the first period of insulin therapy the amounts were 10 mg. and 35 mg. respectively. Methyl thiouracil and thyroid therapy were continued, and insulin requirements fell to 24 units soluble and 24 units protamine zinc insulin in the next week. To show that the increased adrenocortical activity had no part in the ætiology of her diabetes, cortisone was then given in large dosage—100 mg. twice daily for two days and 50 mg. twice daily for twelve days. It was thought, too, that this might have the useful therapeutic effect of diminishing the output of corticotrophin. Despite the cortisone therapy insulin needs continued to fall to 12 units of soluble and 10 units of protamine zinc insulin daily.

Course.—Six months later the storm in the anterior lobe of the pituitary gland had subsided, leaving no more than remediable damage in its wake. The diabetes was controlled with 12 units of insulin daily, the thyroid overactivity was blocked with 50 mg. of thiouracil daily, the production of thyroid-stimulating hormone was depressed with gr. $^1/_8$ of thyroid daily, and the urinary output of 17-ketogenic steroids had fallen to 5 and 6 mg. per 24 hr. A month later the pituitary gland was once again stimulated—this time by the physiological excitement which accompanies pregnancy.

Comments

About 1% of all diabetics have coincidental thyrotoxicosis, and between 2% and 3% of thyrotoxic patients have diabetes. Thyroxine has been shown to be diabetogenic in animals, but the action of the thyroid hormone in exhausting the islet cells appears to be weaker than that of pituitary and adrenocortical hormones. Therefore where human diabetes succeeds long-continued thyrotoxicosis, this may be the result of the diabetogenic action of thyroxine; but, where the onset of thyrotoxicosis and that of diabetes appear to be coincidental, some conjoined pathogenesis may be assumed. The assay of 17-ketogenic steroids in these 2 patients with proved adrenocortical overactivity permits the hypothesis that the cause of the two diseases in these patients is hyperpituitarism.

If we accept that, as in Young's hypothesis, increased output of the growth-hormone may be responsible for diabetes, and that increased output of thyroid-stimulating hormone has caused thyrotoxicosis, the enhanced adrenocortical activity is related to increased production of corticotrophin as follows:



Adrenocortical activity is not usually increased either in thyrotoxicosis or in diabetes. In 14 cases of thyrotoxicosis the output of 17-ketogenic steroids (assayed in from one to four specimens) was never more than 15 mg. per 24 hr. and in 12 cases of diabetes the output of 17-ketogenic steroids was more than 20 mg. per 24 hr. in only 1 case (22 mg. per 24 hr.). The levels reached in cases 1 and 2 are therefore significant—22, 28, 32, 30, and 35, and 48 mg.—an output equal to that attained in Cushing's syndrome or after stimulation of the adrenal cortex by corticotrophin.

Adrenocortical Function in Hypothyroidism

A woman, aged 60, was admitted under my care with advanced myxœdema and died three days later in coma. Her serum-sodium level was 112 m.eq. per litre, and I assumed that adrenocortical failure had a hand in her death, but the histological appearances of the adrenal cortex and of the anterior lobe of the pituitary gland were not abnormal, although the latter seemed to have an excess of basophil cells. Some attention has been given to adrenocortical function in myxœdema, notably by Statland and Lerman (1950).

In the next 4 cases of hypothyroidism admitted to the wards the adrenocortical and pituitary functions were investigated by all available methods. Reference will be made here, however, only to the result of endocrine assays (17-ketosteroids, 17-ketogenic steroids, pituitary gonadotropins, and œstrogens), to the water-load response, and to the effect of corticotrophin and thyroid therapy (see tables I and II).

Case 3.—A woman, aged 66, assessed by her symptoms on clinical examination, had had primary myxœdema for five years. She was thought to be in early congestive cardiac failure when first seen in the outpatient department, but there was no clinical evidence of it on admission three weeks later. The heart shadow had diminished, and the pulmonary congestion had disappeared. For eight days after admission no treatment was given. Then corticotrophin 100 units daily was given, and, despite some retention of fluid, cardiac failure was not precipitated.

Case 4.—A married woman, aged, 31, may have had, from her story, myxœdema for an indefinite time—possibly fifteen years, possibly only six years. She became pregnant sixteen months before admission, and her child was delivered by cæsarean section seven weeks before. Her menses were regular but heavy before pregnancy and were re-established within three months of the cæsarean operation.

Case 5.—A woman, aged 35, had undergone thyroidectomy at the age of 32. Myxœdema was diagnosed when she was 34, and she was given thyroid gr. 3 daily. She remained tired and liable to periods of collapse; and, before I saw her, she had stopped taking thyroid "because I wanted to make sure whether or not I was suffering from myxœdema." She was, and only with thyroid gr. 5 daily did her adrenocortical function become optimal.

Case 6.—A male cretin (see figure) untreated, aged 25, was admitted very ill, not certainly in heart-failure but with pericardial effusion and much retention of fluid. Several urinary endocrine assays were completed in the first few weeks after admission, and a month's thyroid therapy was required to increase his output of 17-ketosteroids from 3 mg. to 5 and 6 mg. per 24 hr. and of 17-ketogenic steroids from 1·5 to 2, 3, and 4 mg. per 24 hr. The water-load test could

TABLE I—URINARY ENDOCRINE ASSAYS IN HYPOTHYROIDISM (BEFORE AND AFTER TREATMENT)

Case no.	Assay	Initial result	Corticotrophin (units × days)		Thyroid (dosage × days)		
			100 × 4	100 × 7	Thyroxine 0·4 mg. × 12		
3	17-Ketosteroids (mg. per 24 hr.)	3·5	6	19	4		
	17-Ketogenic steroids (mg. per 24 hr.)	10	19	30	13		
	Gonadotropins (m.u. per 24 hr.)	20			40		
			60 × 7		Thyroid gr. 3 × 12		
4	17-Ketosteroids	4	8		11		
	17-Ketogenic steroids	5	15		7		
	Gonadotropins	0			0		
	Œstrogens (I.U. per 24 hr.)	18			20		
					Thyroid gr. 3 × 42	gr. 5 × 75	
5	17-Ketosteroids	7			5	6	
	17-Ketogenic steroids	3			6	13	
	Gonadotropins	Traces			40	16	
	Œstrogens	30			0	20	
			60 × 17		Thyroid gr. 3 × 27	gr. 3 × 90	gr. 3 × 160
6	17-Ketosteroids	3	8		5	3·5	11
	17-Ketogenic steroids	1·5	13		4	7	12
	Gonadotropins	0			6	16	18

TABLE II—WATER-LOAD RESPONSE IN HYPOTHYROIDISM (BEFORE AND AFTER TREATMENT)

Case no.	Time and volume of urine	Initial response	Corticotrophin (units × days)	Thyroid (dosage × days)
			100 × 7	Thyroxine 0·4 mg. × 21
3	2nd hr. (ml. per min.)	1	1·5	2·0
	3-hr. total (%)	26	15	38
			60 × 7	
4	2nd hr. (ml. per min.)	10·5	15·8	
	3-hr. total (%)	90	100	
				Thyroid gr. 3 × 7
5	2nd hr. (ml. per min.)	4·5		8·5
	3-hr. total (%)	48		90
				Thyroid gr. 3 × 27 / gr. 3 × 34
6	2nd hr. (ml. per min.)			3·5 / 7·5
	3-hr. total (%)			60 / 95

not be completed until after twenty-seven days' thyroid therapy, but even then it gave less than the normal response.

Endocrine Assays in Hypothyroidism

In these 4 patients with hypothyroidism the adrenocortical function was normal in the 1st, a low normal in the 2nd, deficient in the 3rd (who had been without thyroid therapy for six weeks only), and grossly deficient in the 4th. In each patient the output of 17-ketogenic steroids was increased by thyroid therapy, and the two deficient outputs reached normal levels.

The response of the adrenal cortex to corticotrophin was tested in 3 patients. In the 1st patient the normal cortex was fully responsive; in the 2nd patient after seven days' treatment with corticotrophin 60 units daily the depressed cortex was moderately responsive (17-ketogenic steroids from 5 mg. to 15 mg. per 24 hr.); in the 3rd patient, after thirty-five days' thyroid therapy and seventeen days' treatment with corticotrophin 60 units daily, the partially recovered cortex was capable of a moderate response (17-ketogenic steroids from 1·5 to 13 mg. per 24 hr.). Adrenocortical function is therefore sometimes but not invariably depressed in myxœdema. Statland and Lerman (1950) and Hill et al. (1950) came to a similar conclusion. In my cases this adrenocortical depression was corrected by thyroid therapy. Beierwaltes and Bishop (1954) have found that the excretion of 17-ketosteroids by myxœdematous women is subnormal and will usually increase to normal levels even over periods as short as one and a half months if thyroxine dosage is increased sufficiently.

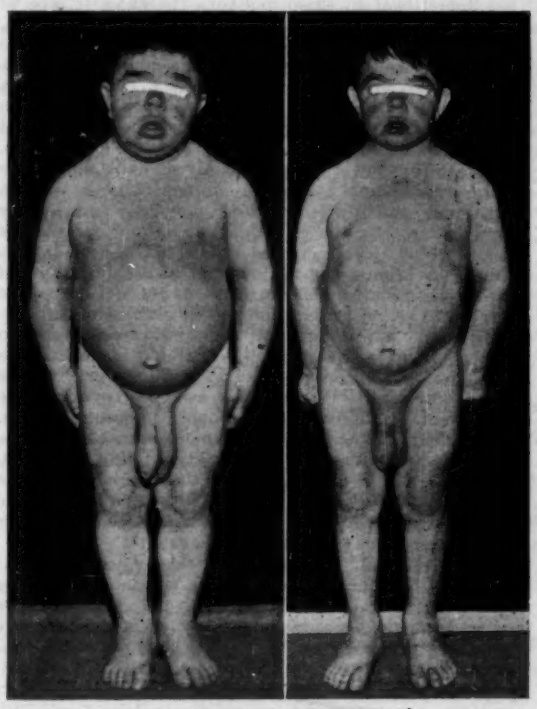
This adrenocortical depression is sometimes regarded as the direct effect of hypothyroidism on the adrenal cortex—"myxœdema of adrenocortical tissue," though Statland and Lerman (1950) observe that this depression may be the result of disturbed pituitary function. In 2 of the 3 patients described above who were stimulated with corticotrophin the depressed adrenal cortex was capable of response while the patients were still hypothyroid. The response was, however, far from normal, and the central problem remains unsettled; for this partial response may indicate that the adrenal cortex is sluggish, either because it suffers from thyroxine lack or because it has been deprived for so long of its normal stimulus to activity—corticotrophin. Indeed both mechanisms may be concerned. It is certainly possible that the output of corticotrophin is sometimes depressed in hypothyroidism.

Water-load Response

In case 3 the water-load response was grossly defective; and, although she might not have fully recovered from her cardiac failure at that time, the water-load response was still not normal after twenty-one days' thyroxine therapy when cardiac failure had long disappeared. Throughout this time adrenocortical function was normal or better than normal (stimulated by corticotrophin). In case 4, despite severe and prolonged myxœdema and mild adrenocortical depression, the water-load response was fully normal. In case 5, in whom myxœdema had followed thyroidectomy, and who had been without thyroid therapy for no more than six weeks, the water-load response was subnormal. Both the response and adrenocortical function were improved by a week's thyroid treatment. In the cretin (case 6) the water-load response was still defective after twenty-seven days' thyroid therapy but was fully restored after thirty-four days' treatment.

The water-load response in myxœdema has been reported to be normal. Levy et al. (1946), investigating the response to the Kepler test in conditions other than Addison's disease, reported a normal response in 3 patients with myxœdema. It should be emphasised that the criteria for the Kepler test are not identical with those for the water-load response as defined above. Gaunt et al. (1944) report a normal diuretic response in rats made hypothyroid with thiouracil. Garrod and Burston (1952) refer to unpublished observations in which patients with myxœdema gave a normal diuretic response.† However, the subject has recently been reopened by Crispell et al. (1954), who report a delayed diuretic response in 8 patients with myxœdema. This delay was corrected with thyroid sometimes after long-continued treatment, but in 4 of 5 patients was not corrected with cortisone. These workers conclude that the delay in

† Since this paper was submitted Garrod and Gilliland have reported that 16 of 18 cases of myxœdema, in response to the standard water-load, exceeded 3 ml. per minute and 50% excretion while the other 2 patients showed a poor diuresis (*Proc. R. Soc. Med.* 1954, **47**, 886).



a b

Cretin, aged 25, showing excessive genital development: *a*, on Feb. 16, 1954, before treatment; *b*, on April 2, 1954, after treatment.

diuresis in myxœdema is not caused by hypo-adrenalism, and observe that their results allow no conclusion about whether this delayed diuresis is associated with the depression of glomerular filtration-rate which is known to occur in myxœdema (Corcoran and Page 1947, Davies et al. 1952) or with increased tubular reabsorption. My results confirm that there may be delayed diuresis in myxœdema which is corrected by thyroid therapy but is not restored by improved adrenocortical function.

This finding of a defective water-load response in hypothyroidism, which conflicts with the previous reports of other workers (although retention of water is a classical feature of myxœdema), could be attributed to the presence of unrecognised cardiac failure. It is appreciated that the differential diagnosis between myxœdema with retention of water and myxœdema with congestive cardiac failure may not be easy; indeed much has been written to illustrate this difficulty. It is not thought that any of the patients reported here were in cardiac failure when the defective water-load response was demonstrated.

The Pituitary in Hypothyroidism

The possibility that hypothyroidism may lead to a decrease in output of corticotrophin from the anterior lobe of the pituitary gland suggests an inquiry into pituitary function in hypothyroidism. It is well established that, in the absence of thyroxine, the output of thyroid-stimulating hormone is greatly increased. This is matched by cellular hyperplasia in the anterior lobe of the pituitary gland. Although enlargement of the pituitary gland has often been reported in myxœdema, adequate studies, using modern techniques, of the results of thyroidectomy and of thyroid aplasia on the pituitary gland are rare; therefore the observations of Crane et al. (1954) on " thyroid-ablated " monkeys are valuable. They found that in these monkeys the anterior lobe of the pituitary gland was increased to twice its normal size, with hyperplasia of the beta-cells. That this excessive growth of tissue in myxœdema can occur in other situations was also shown by my cretin (case 6) (see figure): in the presence of the usual skeletal retardation (height 3 ft. 10 in. and bone age 11–12 years) the penis, testes, and scrotum had grown beyond the average adult size. The prostate gland was not certainly palpable, and there had been no seminal emissions. Moreover, the institution of thyroid therapy stimulated not only androgenic output, shown by the growth of pubic hair (previously absent) and by the increased output of 17-ketosteroids (from 3 to 12 mg. per 24 hr.), but also the output of pituitary gonadotropins from 0 to 6, 16, and 18 mouse units per 24 hr. Although the output of follicle-stimulating hormone was minimal at the time of admission to hospital, there was also ample clinical evidence of the production of anterior-pituitary sex-hormones. The adrenal androgens were unawakened, and possibly the stimulation of luteinising hormone had been lacking. It is evident that in this man hypothyroidism, with the increased production of thyroid-stimulating hormone, had caused some dissociation in the formation of the pituitary sex-hormones. It is also evident that thyroxine is not essential for the growth of cells when there is an adequate supply of the tropic hormone.

Paschkis et al. (1954) report that myxœdematous women of childbearing age often have menorrhagia and metrorrhagia and sometimes polycystic ovaries and endometrial hyperplasia. They suggest that these changes may result from the increased output of gonadotropins (follicle-stimulating hormone). Hypothyroidism, therefore, can disturb the production of anterior-pituitary hormones and although its effects are still uncertain either excess or deficiency of individual hormones may result.

Endocrine Relations and Hypopituitarism

Since the endocrine relations of myxœdema are as complicated as I have suggested, it is not surprising that the endocrine relations in hypopituitarism are difficult to elucidate. I have observed (Hubble 1952) that in anterior-pituitary deficiency, whatever the cause, sexual failure always precedes thyroid and adrenocortical failure which may be long delayed. This has been accepted by other workers, and Peters et al. (1954) suggest that thyroid failure follows sexual failure, and that adrenocortical failure is always the last to appear. Though this observation may sometimes be correct, amenorrhœa in females, with loss of sexual hair, and loss of libido in both sexes indicate more or less definitely the onset of sexual failure, but the assessment of thyroid and of adrenocortical function has only recently become accurate.

Many workers have commented on the fact that in hypopituitarism the blood-cholesterol level provides an inadequate index of hypothyroidism, and that the basal metabolic rate (B.M.R.) may be reduced by other factors than a lack of thyroxine (Querido et al. 1954, Peters et al. 1954). Radio-iodine studies and the estimation of protein-bound iodine are providing much more accurate information about the function of the thyroid.

Similarly it is important that in estimating adrenocortical function in hypopituitarism the tests used should be precise, sensitive, and specific. Peters et al. (1954), reporting on the sequence of endocrine failure in 34 patients with hypopituitarism, are content with blood-sugar and serum-electrolyte estimations as their index of adrenocortical function. The height of the blood-sugar level is not the result of a specific adrenocortical mechanism, and the estimation of serum-electrolytes can reveal only a severe degree of adrenocortical deficiency. It is therefore not surprising that these workers cannot report any case in which adrenocortical deficiency appeared before hypothyroidism declared itself.

Case 7.—A male patient, aged 61, with hypopituitarism associated with a large tumour (probably a craniopharyngioma). The B.M.R. was −5%, the blood-cholesterol level was 165 mg. per 100 ml., the peak uptake of I^{131} was 29% of the administered dose, and there was no clinical evidence of hypothyroidism. Yet the water-load response was not only grossly defective (2·8 ml. per min. in the second hour and 35% total excretion in three hours) but also was easily corrected with cortisone. The output of 17-ketosteroids was 2 mg. per 24 hr. and of 17-ketogenic steroids 4 mg. per 24 hr.

Here, then, is one patient in whom the thyroid function is complete, by all available tests, while adrenocortical function is deficient. Two patients of mine with post-partum necrosis of the pituitary have also shown normal thyroid function with defective adrenocortical function.

That the endocrine relations of hypopituitarism may still be obscure despite the use of these modern methods is illustrated by the following 2 cases:

Case 8.—A married woman, aged 45. Her menses started at the age of 17. Her only child was born in May, 1928, when she was aged 20. She had a normal confinement, and the baby was breast-fed. She has had no menses since. Axillary and pubic hair had never been profuse but disappeared entirely in the next year or two. Subsequently she became tired and sensitive to cold. Myxœdema was diagnosed when she was aged 34, and she has taken thyroid gr. 3 daily since. Libido diminished at the age of 35 and quickly disappeared. She presented the total picture of hypopituitarism on admission to the ward on April 27, 1954. Thyroid therapy was stopped two weeks before admission.

Investigations.—The output of urinary gonadotropin and œstrogen, assayed on four occasions, was nil; that of urinary 17-ketosteroids was 1·5 mg. per 24 hr.; and of urinary 17-ketogenic steroids 3·5 mg. per 24 hr. The I^{131} peak uptake was 5% of 23·6 μC. The water-load response was >1 ml. per min. in the second hour, and 17% in three hours. Biochemical investigations were normal except for hypercholesterolæmia. The water-load response was not corrected by corticotrophin 60 I.U. × 7 or by cortisone 50 mg. × 13.

After treatment with thyroid gr. 3 × 37 and with cortisone 50 mg. × 49 the flow in the first hour was 4·6 ml. per min. and in the second hour 1·2 ml. per min., and the total in three hours was only 33%. Diuresis occurred seven hours after the water-load. The patient is in perfect health with cortisone and thyroid therapy.

Case 9.—A married woman, aged 50, had undergone, fourteen years previously, subtotal thyroidectomy for thyrotoxicosis. Her menses ceased at the same time. After an operation for thrombosed piles, five years ago, she had a severe uterine hæmorrhage, and since then she has suffered from fatigue, loss of libido, and sensitivity to cold. Pubic and axillary hair has disappeared during the last five years.

Investigations.—Urinary œstrogens were absent from three of four assays. Urinary gonadotropins were 6, 16, 40, and 70 mouse units per 24 hr. (these last two assays were made after thyroid therapy). Urinary 17-ketosteroids were 1·5, 3, 2·5, and 4 mg. per 24 hr. and urinary 17-ketogenic steroids 5, 4, and 7 mg. per 24 hr. The I^{131} peak uptake was 7·2% of 20·1 μC. Biochemical investigations were normal except for hypercholesterolæmia. The water-load response was 3 ml. per min. in the second hour, and 32% in three hours. The adrenal cortex was responsive to stimulation by corticotrophin. Neither thyroid nor cortisone fully corrected the water-load response: at the end of a month's therapy the flow was 3·2 ml. per min. in the second hour and the total excretion 50% in three hours.

Comments

Case 8 probably had pituitary inadequacy which developed gradually into total pituitary failure after her first and only confinement. Case 9 had postoperative myxœdema and an early menopause with partial adrenocortical failure, including androgen deficiency, after the uterine hæmorrhage five years previously. Both showed a gross defect of the water-load response, which was not corrected by cortisone but is being slowly restored by thyroid therapy.

The delayed diuresis in myxœdema may not be corrected until some months after adequate thyroid therapy has been instituted. This has been so in 2 of my patients and in some of the cases reported by Crispell et al. (1954). Corcoran and Page (1947) found that in 2 patients with myxœdema the renal blood-flow had not returned to normal after two and three months' treatment.

The conclusion to be drawn from these cases is that, if adequate cortisone therapy in hypopituitarism has not corrected the delayed diuresis, this defect is associated with predominant hypothyroidism, whether primary or secondary. Thyroid therapy may then take some months to correct the defect. Cortisone restores the water-load response in hypopituitarism within a day or two if it is due to adrenocortical deficiency, whereas thyroid therapy in hypothyroidism restores the renal blood-flow much more slowly.

Conclusion

One principle emerges from this investigation—i.e., when we are discussing endocrine relations we must not forget the pituitary. The controlling tropic mechanisms are there centred, balanced by their target hormones, and no change takes place in the peripheral gland without its accompanying change in pituitary function. This pituitary change may concern not only an excess or a deficiency of the appropriate tropic hormone, but this in turn may cause an altered output of other tropic hormones. Hypothyroidism has been shown to illustrate this possibility.

The sequence of endocrine failure in hypopituitarism allows us another glimpse into the complicated functions of the pituitary. While the maintenance of thyroid and adrenocortical function, after sexual failure has occurred, may depend partly on the fact that these two glands are allowed some degree of "provincial autonomy," the evidence from endocrine assays suggests strongly that the sex-hormones fail first, whatever the nature of the assault in the pituitary. Are they then the end-product of cellular function, and is biosynthesis, when the pituitary faces destruction, carried no further than the formation of corticotrophin and thyroid-stimulating hormone? The chemists will one day tell us.

Meanwhile, some will say, speculation is useless, and I might agree with them did I not believe that the modern insistence on peripheral mechanisms is obstructing our understanding. We are content to explain the association of thyrotoxicosis and diabetes by a peripheral mechanism—the effect of too much thyroxine on metabolism, on the beta-cells of the pancreas, and on hepatic glycogen—but I have here described 2 cases of diabetes and thyrotoxicosis in which there is evidence of hyperpituitarism—too much corticotrophin, too much growth-hormone, and too much thyroid-stimulating hormone.

We may dislike Langdon-Brown's notion of the pituitary as "the leader of the endocrine orchestra"—certainly a mechanism which can continue to prod a member of the band who is quite incapable of response while allowing other active members to languish for want of their essential stimulant hardly deserves the title—yet this does not justify us in forgetting that the pituitary must always be the centre of endocrine relations.

Summary

The best test of adrenocortical function in excess or deficiency is provided by the Norymberski method for assay of the urinary 17-ketogenic steroids; the failure of adrenocortical function is well shown by a defect in the water-load response which is easily corrected with cortisone.

2 patients are described in whom coincidental thyrotoxicosis and diabetes were accompanied by overactivity of the adrenal cortex. It is suggested that these are examples of hyperpituitarism.

The adrenocortical function was depressed in 2 patients with hypothyroidism and was restored by thyroid therapy. There is evidence that this depression of adrenocortical function may be partly mediated through the anterior lobe of the pituitary gland, whose function may be variously deranged in hypothyroidism.

An impaired response to a water-load was present in 3 patients with hypothyroidism and was gradually restored by thyroid therapy.

If the defective water-load response in hypopituitarism is not fully corrected with cortisone, a degree of hypothyroidism may be present requiring thyroid therapy which will slowly correct the defective water-load response.

The numerous endocrine assays were made in the Jessop Hospital for Women, Sheffield, and I am very grateful to Dr. G. C. Paine, Mr. L. F. Mitchell, PH.D., and Mr. M. J. Level, B.SC., for making this work possible. Miss A. Matthews, B.SC., Sister L. M. Edwards, and Sister J. E. Smedley controlled the laboratory and ward work with exemplary care.

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CORTISONE IN EXOPHTHALMOS

REPORT ON A THERAPEUTIC TRIAL OF CORTISONE AND CORTICOTROPHIN (A.C.T.H.) IN EXOPHTHALMOS AND EXOPHTHALMIC OPHTHALMOPLEGIA BY A PANEL APPOINTED BY THE MEDICAL RESEARCH COUNCIL *

THE conflicting reports of the value of cortisone and corticotrophin (A.C.T.H.) in exophthalmic ophthalmoplegia suggested the desirability of a larger inquiry into the usefulness of such treatment of a condition hitherto difficult of control. The original interest was in examples of exophthalmic ophthalmoplegia of progressive or "malignant" type, but during the course of the trial patients with lesser degrees of proptosis and without ophthalmoplegia were also included. The terms proptosis and exophthalmos are used interchangeably in this report.

Scope of the Study

28 patients were treated, 10 men and 18 women, whose ages ranged from 22 to 79 years. One case (no. 11, table II) features twice in some of the tables, owing to an acute exophthalmic episode developing during the course of observation, and this must be borne in mind in relation to the statistical presentation in the tables.

Thyroid Status

Clinical impression of thyroid function, supplemented in many patients by estimations of basal metabolic rate and radio-iodine studies, indicated coexisting thyrotoxicosis in 15 patients (53%) at the start of treatment. In 12 patients (43%) thyroid status had either been normal throughout the illness or had become so under

* The members of the panel were :

Sir RUSSELL BRAIN (chairman) — Dr. RAYMOND GREENE
Dr. K. ATERMAN — Dr. E. E. POCHIN
Dr. C. L. COPE — Dr. E. F. SCOWEN
Prof. D. M. DUNLOP — Dr. W. R. TROTTER
Dr. T. RUSSELL FRASER — Prof. E. J. WAYNE
Prof. S. J. HARTFALL (secretary)

TABLE II—EFFECT OF CORTISONE AND CORTICOTROPHIN IN 28 PATIENTS WITH EXOPHTHALMOS AND/OR EXOPHTHALMIC OPHTHALMOPLEGIA

Case no.	Duration	Age	Sex	Type and severity of exophthalmos	Ocular muscle function	Thyroid status	Drug and dosage	Effect of treatment
1	2 months	63	M	Without chemosis. Proptosis moderate	R.S.R. and R.I.O. paretic	Euthyroid	C 200 mg. daily for 21 days	Ophthalmoplegia : Unchanged. Exophthalmos : Slight improvement. Thyroid function : Depressed (I^{131})
2	1 year	31	M	Without chemosis. Proptosis moderate	R.S.O. paretic	Thyrotoxic	C 200 mg. daily for 21 days	Exophthalmos : Temporary improvement. Ophthalmoplegia : Area of diplopia decreased. Thyroid function : Thyrotoxicosis controlled (I^{131})
3	1 year	46	F	Without chemosis. Proptosis moderate	R.S.O. paretic	Thyrotoxic	C 200 mg. daily for 14 days	Exophthalmos : Slight improvement. Ophthalmoplegia : Unchanged. Thyroid function : Some depression (I^{131})
4	7 months	32	F	Without chemosis. Proptosis moderate	Normal	Thyrotoxic	C 200 mg. daily for 11 days	No effect on exophthalmos or thyroid function
5	18 months	44	F	Without chemosis. Proptosis moderate	Normal	Thyrotoxic	C 50 mg. daily for 31 days	Exophthalmos : Increased. Thyroid function : Temporary remission—subsequent relapse (I^{131})
6	1 year	55	M	With chemosis. Proptosis moderate	Normal	Thyrotoxic	C 100 mg. daily for 21 days	No effect on exophthalmos or thyroid function
7	6 years	55	M	With chemosis. Proptosis moderate	E.R., S.R., and I.O. paretic both eyes	Thyrotoxic	A.C.T.H. 100 mg. daily for 15 days	Exophthalmos : Marked improvement. Ophthalmoplegia : Improved. Thyroid function : Thyrotoxicosis controlled (B.M.R.). Local effect : Chemosis lessened
8	6 years	49	M	Without chemosis. Proptosis slight	R.E.R. paretic	Euthyroid	C 100 mg. daily for 17 days. 800 mg. Na intake daily	No effect on exophthalmos, ophthalmoplegia, or thyroid function
9	7 years	65	F	With chemosis. Proptosis severe	R.S.R. and L.S.R. paretic	Euthyroid	C 100 mg. daily for 24 days. Low-sodium diet	Exophthalmos : Marked improvement. Ophthalmoplegia : Temporary improvement. Thyroid function : Depressed (B.M.R.). Local effect : Improvement in chemosis
10	1 year	79	M	With chemosis. Proptosis moderate	R.S.R. and L.S.R. paretic	Euthyroid	C 100 mg. daily for 33 days. Low-sodium diet	Exophthalmos : Slight improvement. Ophthalmoplegia : Unchanged. Thyroid function : Unchanged. Local effect : Improvement in chemosis
11a	9 months	50	F	Without chemosis. Proptosis moderate	S.R. paralysed E.R. paretic both eyes	Thyrotoxic	C 100 mg. daily for 37 days	No effect on exophthalmos or ophthalmoplegia. Thyrotoxicosis controlled (B.M.R.)
11b	1 day	,,	,,	With chemosis. Proptosis severe	Complete ophthalmoplegia	Euthyroid	A.C.T.H. 100 mg. daily for 18 days. Low-sodium diet	Exophthalmos : Dramatic improvement. Ophthalmoplegia : Marked improvement. Thyroid function : Unchanged. Local effect : Marked improvement
12	10 months	70	F	With chemosis. Proptosis moderate	R.S.R. and R.I.O. paretic	Thyrotoxic	A.C.T.H. 100 mg. daily for 21 days	No effect on exophthalmos, ophthalmoplegia, or thyroid function. Improvement in chemosis
13	1 year	25	F	Without chemosis. Proptosis slight	Normal	Euthyroid	C 100 mg. daily for 31 days	No effect on exophthalmos or thyroid function
14	4 months	57	M	With chemosis. Proptosis severe	I.O. and S.R. both eyes	Thyrotoxic	A.C.T.H. 100 mg. daily for 21 days	Exophthalmos and ophthalmoplegia worse Thyroid function : Unchanged. Local effect : Improvement in chemosis

TABLE I—SEVERITY OF EXOPHTHALMOS AND INCIDENCE OF OPHTHALMOPLEGIA AMONG 28 PATIENTS SUBDIVIDED INTO THOSE WITH AND THOSE WITHOUT CHEMOSIS

Type of exophthalmos	Severity of exophthalmos			No. of patients with ophthalmoplegia	No. of patients without ophthalmoplegia
	Slight	Moderate	Severe		
With chemosis ..	0	10	5	12	3
Without chemosis	4	10	0	7	7
Total	4	20	5=29*	19	10=29*

* One case (no. 11) features twice, owing to an acute exophthalmic episode, controlled with corticotrophin, developing during the course of observation following an initial period of treatment with cortisone.

the influence of anti-thyroid drugs or surgery. One patient (case 27) was subthyroid.

Exophthalmos, Ophthalmoplegia, and Chemosis

For purposes of classification, severity of exophthalmos has been graded as slight, moderate, or severe, a distinction made on clinical grounds as well as by measurements of proptosis (for the exophthalmometer cannot record exophthalmos as an absolute). Consideration was given to the use of the terms "fatty" and "œdematous," but our criteria have only enabled us to state whether the cases have chemosis and œdema, or whether these features were absent. The cases are therefore divided into those with chemosis and those without this feature.

The distribution of the types of exophthalmos (i.e., their severity), and the existence of ophthalmoplegia, together with the presence or absence of chemosis among the patients studied, is shown in table I. It will be seen that weakness of the extrinsic ocular muscles complicated the exophthalmos in 18 of the 28 patients. The table shows that patients with chemosis have, on the average, a more severe degree of exophthalmos and more paralysis than patients without chemosis.

Treatment

In general, cortisone was given in the usual dosage (table II). It is notable that no side-effects from hypercorticism have been seen in this series. Cortisone has been used in 23 patients and corticotrophin in 5 patients (excluding cases 16 and 18, which had small doses of

TABLE II—(*continued*)

Case no.	Duration	Age	Sex	Type and severity of exophthalmos	Ocular muscle function	Thyroid status	Drug and dosage	Effect of treatment
15	2½ years	38	F	Without chemosis. Proptosis moderate	Diplopia on upward movement	Euthyroid	C 200 mg. for 2 days. C 100 mg. for 11 days. C 150 mg. for 4 days	No effect on exophthalmos, ophthalmoplegia, or thyroid function
16	5 years	38	F	Without chemosis. Proptosis moderate	Normal	Euthyroid	C 200 mg. for 2 days. C 100 mg. for 10 days. C 200 mg. for 4 days. A.C.T.H. 37·5 mg. for 2 days	No effect on exophthalmos or thyroid function
17	10 months	22	F	Without chemosis. Proptosis moderate	Normal	Thyrotoxic	C 200 mg. for 2 days. C 100 mg. for 9 days. C 200 mg. for 7 days	Exophthalmos: Unchanged. Thyroid function: More hyperthyroid (B.M.R.)
18	4½ years	68	M	Without chemosis. Proptosis slight	Normal	Euthyroid	C 100 mg. for 13 days. C 200 mg. for 5 days. A.C.T.H. 25 mg. for 2 days	Exophthalmos: Increased
19	18 months	47	M	With chemosis. Proptosis moderate	L.E.R. paretic	Thyrotoxic	A.C.T.H. 50 mg. daily for 21 days	Exophthalmos: Unchanged. Thyroid function: Thyrotoxicosis worse (B.M.R.). Local effect: Chemosis improved
20	17 years	39	M	With chemosis. Proptosis severe	L.E.R. and R.E.R. paretic	Euthyroid	C 200 mg. daily for 4 days. C 100 mg. daily for 10 days	No effect on exophthalmos, ophthalmoplegia, or thyroid function. Local improvement in chemosis
21	7 months	39	F	With chemosis. Proptosis severe	Diplopia upwards and downwards	Thyrotoxic	C 100 mg. for 8 days. C eyedrops	No effect on exophthalmos, ophthalmoplegia, or thyroid function. Local effect: Slight improvement
22	2 years	58	F	With chemosis. Proptosis moderate	Normal	Euthyroid	C 100 mg. for 6 days. C eyedrops	No effect on exophthalmos, ophthalmoplegia, or thyroid function. Local effect: Slight improvement
23	4 months	27	F	With chemosis. Proptosis moderate	Normal	Thyrotoxic	C 100 mg. daily for 21 days	No effect on exophthalmos. Reduction in thyroid function (B.M.R.). Local effect: Improvement in conjunctival œdema
24	2½ years	51	F	Without chemosis. Proptosis moderate	Defective upward movement	Euthyroid	C 100 mg. daily for 21 days	No effect on exophthalmos. Thyroid function: Depression of hyperthyroidism (B.M.R.)
25	1 month	22	F	Without chemosis. Proptosis slight	Normal	Thyrotoxic	C 100 mg. daily for 21 days	Thyroid function: Thyrotoxicosis controlled (B.M.R.). No other change
26	4 months	41	F	With chemosis. Proptosis moderate	Reduced	Thyrotoxic	C 100 mg. daily for 21 days	Exophthalmos: Slight improvement. Ophthalmoplegia: Unchanged. Thyroid function: Control of thyrotoxicosis (B.M.R.). Local effect: Great improvement in chemosis
27	18 months	44	F	With chemosis. Proptosis moderate	L.I.O. and L.S.O. paretic	Subthyroid	C 100 mg. daily for 21 days	No effect. Local effect: Improvement slight
28	3 months	48	F	With chemosis. Proptosis moderate	Limited up and out	Euthyroid	C 200 mg. 1st day, then 100 mg. daily for 23 days	Exophthalmos: No effect. Ophthalmoplegia: Unchanged. Thyroid function: Unaltered. Local effect: Definite improvement

S.R. = superior rectus. E.R. = external rectus. I.O. = inferior oblique. S.O. = superior oblique. C. = cortisone. A.C.T.H. = corticotrophin. Where change in thyroid function was observed as a result of treatment, the criteria by which this was measured—basal metabolic rate (B.M.R.) or radio-iodine studies (I^{131})—are indicated.

corticotrophin for two days at the end of a course of cortisone treatment). The duration of treatment exceeded two weeks except in 3 patients (cases 4, 21, and 22), and averaged three weeks in the remainder.

4 patients (cases 8–11) were given a diet providing a calculated daily sodium intake of 800 mg. All other drugs were discontinued except in 1 patient (case 15), who received thyroid extract grains 2 daily throughout the period of cortisone administration.

Results

The details of treatment and its effect on proptosis and chemosis in individual patients are shown in table II. The effect of treatment has been studied in relation to the following points :

1. Effect on proptosis and ophthalmoplegia.
2. Local effect on chemosis and œdema.
3. Effect on thyroid function.

Effect on Proptosis and Ophthalmoplegia

The effect of treatment on proptosis has been classed under the following headings :

1. Marked improvement—patients showing a reduction in exophthalmos of 5 mm. or more in either eye.
2. Slight improvement—patients showing a reduction in exophthalmos of 2–5 mm.
3. No effect.

The over-all results have been disappointing. 3 patients (cases 7, 9, and 11b) showed a marked improvement, and 2 of these 3 patients who obtained a substantial degree of measurable benefit from treatment (cases 7 and 11b) received corticotrophin. 5 patients (cases 1, 2, 3, 10, and 26) showed a more modest response, classed as slight improvement, which was temporary and not sustained. The drug used in these was cortisone. In no case has a permanent reduction in proptosis occurred and later relapse has always taken place. In 3 patients (cases 5, 14, and 18) the exophthalmos slightly increased during treatment.

Improvement in ocular muscle function occurred in parallel with regression of proptosis in 4 patients (cases 2, 7, 9, and 11) with consequent decrease in the area of diplopia. It was notable that the muscles of elevation were usually the first and generally the most severely affected, and were also the first to show functional recovery.

Improvement in chemosis was the most constant response and improvement has occurred in the 15 patients who showed this feature.

Analysis of the results shows that improvement in proptosis was limited to those patients with ophthalmoplegia and was similar in the group with and the group without chemosis : exophthalmos unaccompanied by ocular muscle weakness was uninfluenced by treatment (table III).

Table IV shows that there is a tendency for the proportion of patients showing improvement in exophthalmos to decline with increasing duration of the condition, but the numbers are too small for a firm conclusion to be drawn. The improvement in ophthalmoplegia was not correlated with duration of the complaint.

TABLE III—EFFECT OF TREATMENT ON EXOPHTHALMOS RELATED TO INCIDENCE OF OPHTHALMOPLEGIA

Type of exophthalmos	Total no.	Patients with ophthalmoplegia		Patients without ophthalmoplegia	
		No. showing improvement in exophthalmos	No change or worse in exophthalmos	No. showing improvement in exophthalmos	No change or worse in exophthalmos
With chemosis..	15	5	7	0	3
Without chemosis	14	3	4	0	7
Total	29*	8	11	0	10

* Case 11 features twice.

TABLE IV—EFFECTS UPON CHEMOSIS, EXOPHTHALMOS, AND OPHTHALMOPLEGIA IN RELATION TO THE DURATION OF EXOPHTHALMOS

Duration	Chemosis		Exophthalmos		Ophthalmoplegia	
	No. of cases	Improved	No. of cases	Improved	No. of cases	Improved
Less than 6 months	5	5	6	3	5	1
6 months–2 years	6	6	13	3	8	1
2 years +	4	4	10	2	6	2
Total	15	15	29*	8	19*	4

* Case 11 features twice.

Effect of Treatment on Thyroid Function

15 patients (53%) were hyperthyroid before treatment, and after treatment the level of thyroid function was depressed in 8 of these. The improvement in thyrotoxicosis was attended in half of these patients by some improvement in exophthalmos ; in those patients whose thyroid hyperfunction remained unaltered by treatment no local benefit occurred. The numbers are too few to suggest any difference between the cortisone and corticotrophin groups. It is possible upon occasion that modification of coexisting thyrotoxicosis might be a factor bearing upon the success of treatment. A study of the case-records, however, shows no further evidence of therapeutic indication, and it seems impossible to select in advance those patients with thyrotoxicosis who are likely to respond.

Among 13 euthyroid patients some depression of thyroid function was recorded in 3 cases under treatment.

Effect of Sodium Restriction

4 patients (cases 8–11) were given a diet providing a daily sodium intake of 800 mg. during the period of administration of cortisone or corticotrophin. Only 1 patient (case 8) failed to derive objective benefit. Sodium balance determinations did not show any clear evidence of a saline diuresis, though in general a negative sodium balance was established (Chandler and Hartfall 1952).

Discussion

28 patients with exophthalmic ophthalmoplegia have been treated with cortisone or corticotrophin. At the dosage used no beneficial effect was observed in 20 patients ; 5 showed slight temporary improvement and 3 responded well. This difference in individual response is reflected in the publications of other investigators (Lederer and Hambresin 1950). The reasons for the disparity are not immediately obvious, though a recent report (Kinsell et al. 1953) suggests that the dosage employed in this trial has been inadequate. Kinsell et al. advised the intravenous administration of corticotrophin (20–40 units per litre) throughout the first three days of treatment, together with 200–600 mg. of cortisone by the oral or intramuscular route, daily. 9 patients treated by this scheme of dosage obtained, without exception, significant decrease in proptosis within forty-eight hours of commencement, an improvement maintained by continued treatment with corticotrophin gel. These authors emphasised that very prolonged administration may be required in some patients, and the high incidence of untoward effects that attended such treatment is in sharp contrast to the experience in this trial. The conspicuous therapeutic successes reported by Kinsell et al. would seem to require that a considerably higher dosage of cortisone and corticotrophin be employed in any further work (Dayton, Okie, and Beierwaltes 1954).

The best results in this series were obtained in those patients whose exophthalmos was of recent origin or had suddenly and rapidly progressed. The most striking and constant clinical finding was the improvement in chemosis in each of the 15 cases where this feature was present.

If local withdrawal of fluid from the orbital tissues and relief of orbital œdema were the factors responsible for clinical improvement (Campbell 1952), such an effect could only be expected in exophthalmos of recent origin before fibrotic changes have occurred in the ocular muscles and tissues. Support for this hypothesis is afforded by the results of treatment seen in relation to the duration of history (table IV). for of 6 instances of exophthalmos of less than six months' duration, 3 showed improvement. One of these (case 11b) had developed malignant exophthalmos after the incision of an abscess under general anæsthesia; the rapid control of this patient's post-anæsthetic increase in proptosis by corticotrophin was highly encouraging. Of 23 patients in whom exophthalmos had been present for longer than six months only 5 obtained benefit from treatment.

The patients in whom exophthalmos and thyrotoxicosis coexist form a group of particular therapeutic difficulty. In this trial, depression of thyroid function was observed in 8 of 15 patients initially thyrotoxic. Of these, 4 derived some benefit from treatment, regression of exophthalmos occurring concomitantly with apparent control of the thyrotoxic state. 13 patients were euthyroid at the start of treatment, and 4 of these obtained improvement in exophthalmos. The difference in response between the two groups of thyrotoxic and euthyroid patients is not statistically significant, but the depression of coexisting thyroid hyperfunction observed in some of the patients treated with cortisone or corticotrophin might perhaps suggest that these drugs are worthy of trial where thyrotoxicosis accompanies exophthalmos. There were, however, no specific features except perhaps chemosis which enabled a more confident selection to be made of suitable patients, and further information and study are required here.

The results in 10 patients who showed exophthalmos unaccompanied by ocular muscle weakness have been entirely disappointing and no benefit from treatment has been observed. Most of these patients belonged to the group without chemosis and œdema.

It is possible that the dietary restriction of sodium may be responsible for clinical improvement. Of the 4 patients submitted to a low sodium intake 3 showed appreciable improvement.

Conclusions

1. No significant benefit occurred in the majority of patients suffering from exophthalmos and/or exophthalmic ophthalmoplegia, from treatment with cortisone or corticotrophin (A.C.T.H.). Inadequate therapeutic response may in some instances be referable to inadequate and insufficiently prolonged dosage.

2. Cortisone and corticotrophin are worthy of further trial in patients with progressive exophthalmos of sudden or recent onset with chemosis.

3. A group of patients whose proptosis was unaccompanied by chemosis and œdema, and usually without ophthalmoplegia, showed the least response to treatment.

4. Coexisting thyrotoxicosis was reduced in a number of patients and half of these patients derived local benefit from treatment.

5. If further trials are undertaken, it is suggested that the dosage of cortisone and corticotrophin be considerably increased and special consideration be given to the use of serial intravenous corticotrophin infusions, perhaps combined with dietary restriction of sodium.

The panel wish to record the help given by Dr. G. N. Chandler in the preparation of this report.

References at foot of next column

BRONCHOSCOPIC APPROACH FOR MEASURING PRESSURE IN LEFT AURICLE, PULMONARY ARTERY, AND AORTA

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SINCE the original papers were published on puncturing the left auricle through a bronchoscope (Facquet et al. 1952, 1954, Allison and Linden 1953) further experience of the method has been gained, a greater facility in the interpretation of the curves has been acquired, and the technique has been extended to the measurement of pressure in the pulmonary artery and the aorta.

With thoroughly effective local anæsthesia and smooth bronchoscopy, puncture of the heart or of the great vessels is no more uncomfortable than simple bronchoscopy. Such punctures were done on 121 patients without causing illness or death, and 67 of them are reviewed here.

Method

The apparatus was similar to that previously described by Allison and Linden (1953) but was improved by the use of a shorter thicker-walled wider-bore 'Polythene' tube, which is now 25 cm. long, with 4 mm. bore and wall 1·3 mm. thick. The resulting increased rigidity of the apparatus ensures a higher natural frequency of the recording system and prevents oscillation of the polythene tubing.

Puncture of left auricle.—When the bronchoscope is passed down the right side of the mouth, it is usual to puncture the anterior wall of the left main bronchus 0·5–1·0 cm. below the carina. Whichever side is used in the approach, it is essential to direct the bronchoscope and needle along the line of the sternum. When the pulmonary arteries are greatly enlarged, the space between them at their origin may be so small that the left auricle is obscured; the arteries are then more liable to be pierced within the pericardium. Although no obvious harm has resulted from this, at operation the pericardial fluid has been found stained, for the large arteries are obviously more liable to bleed under increased tension. When they are very large they may be avoided by passing the bronchoscope down the right main bronchus for 1–2 cm. to reach beyond the level of the arteries, and the auricle may then be reached by puncturing the anteromedial wall of the right bronchus.

Puncture of the pulmonary artery is better done extrapericardially. The bronchoscope is withdrawn into the trachea just above the carina, the head of the patient is depressed further, and the needle passes through the anterior wall of the trachea.

Puncture of aorta.—The aorta can be reached by inserting the needle 2–3 cm. higher up the trachea than is done to reach the pulmonary artery.

Tracings.—In all the tracings an electrocardiogram and a phonocardiogram were recorded to facilitate the recognition of the individual waves of the pressure-pulse contours. Pressure records were taken with the centre of the manometer membrane levelled to the manubrium

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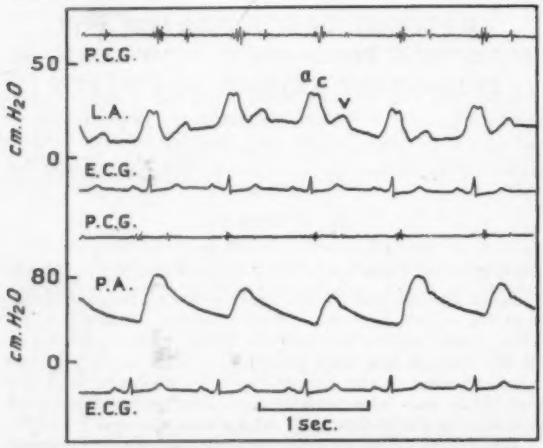

Fig. 1—Typical record of pulmonary-artery (P.A.) pressure, taken through bronchoscope immediately after recording left-auricular (L.A.) pressure, in a patient with mitral stenosis and sinus rhythm: P.C.G., phonocardiograph.

sterni, and this point is taken as the zero reference point in all the figures.

Results and Discussion

Pulmonary Artery

The pulmonary-artery tracings, though valuable records, have not so far added anything to the knowledge gained from cardiac catheterisation. To be able to take a record of pulmonary-artery pressure and a left-auricular pressure at the same examination obviates the need for catheterisation and is particularly valuable for long-term follow-up, for it can be repeated indefinitely. A typical record of pulmonary-artery pressure taken through the bronchoscope immediately after recording left-auricular pressure is shown in fig. 1.

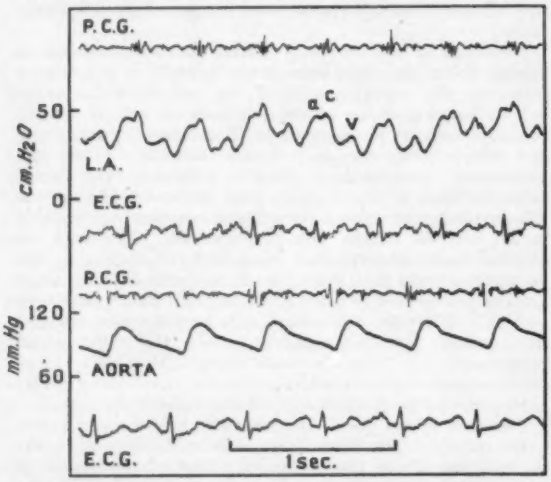

Fig. 2—Left-auricular (L.A.) and aortic pressures in a patient with mitral stenosis, showing absence of aortic incompetence.

Aorta

In some patients the aortic pressure was recorded, but the true value of this has not yet been assessed. A bronchoscopic aortic-pressure record is shown in fig. 2. Clinically, the patient from whom this tracing was taken had mitral stenosis, and in addition the physical signs suggested either aortic or pulmonary incompetence. The aortic record showed that there was no aortic incompetence.

Left Auricle

The left-auricular pressures in normal hearts from patients in this abnormal position and with a bronchoscope in place were recorded in 5 patients with diseased lung and no cardiovascular disease. A typical example of a left-auricular pressure taken from a patient with a normal heart is seen in fig. 3. The *a* wave of auricular systole is seen clearly starting 0·1 sec. before the R wave of the electrocardiogram (E.C.G.). The *c* wave, in time with the onset of ventricular contraction, is very small and occurs 0·04 sec. after the R wave. It is noticeable mainly because of the abrupt alteration in gradient at this point. This is followed by the prominent *v* wave about 0·1 sec. after the end of the T wave of the E.C.G.

61 patients with mitral disease, in whom the diagnosis was made with certainty, were included in this series. In 48 of them the diagnosis was confirmed at operation, when examination of the external surface of the heart revealed the position of thrills, and a finger inside the left auricle decided the presence or absence of a regurgitant stream. In the remaining 13 the diagnosis, determined on clinical and radiological evidence, was also beyond dispute but not confirmed by operation.

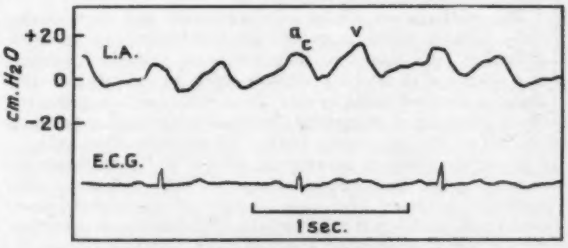

Fig. 3—Left-auricular pressure typical of normal heart.

The results fall naturally into two groups: patients with sinus rhythm, and those with auricular fibrillation. It is necessary only to attempt to differentiate between mitral stenosis and mitral regurgitation within each group.

Of those with sinus rhythm 28 had pure mitral stenosis (26 confirmed at operation), and 6 were diagnosed clinically and radiologically as having mitral regurgitation. A typical record from a patient with pure mitral stenosis is seen in fig. 1. The appearance of the pressure-pulse contour is similar to that found in normal tracings, but the pressures at all points are raised. The *a*, *c*, and *v* waves are distinguished easily, and the magnitude of the *v* wave is less than that of the *a* wave.

The records from the 6 patients with sinus rhythm and mitral regurgitation, though few, show different pressure-pulse contours. They are similar to those obtained in dogs by Wiggers and Feil (1922), who produced regurgitation by preventing the mitral valve from closing during

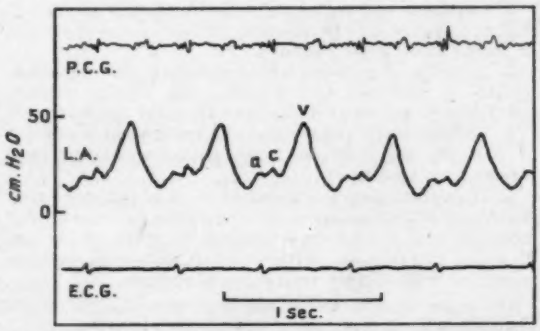

Fig. 4—Left-auricular pressure in a patient with mitral regurgitation and sinus rhythm.

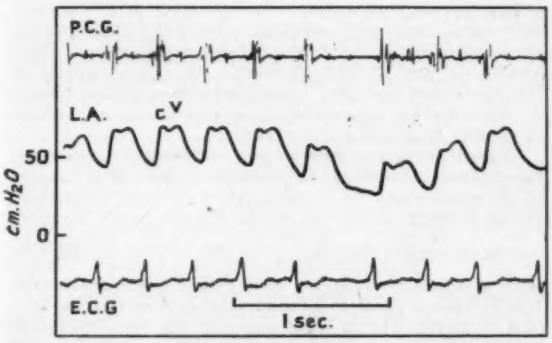

Fig. 5—Left-auricular pressure in a patient with mitral stenosis and auricular fibrillation.

ventricular systole. In these circumstances the left-auricular pressure-pulse contour showed a rise in pressure, starting not in early systole but in mid to late systole with a relatively high *v* wave. A record from a patient with pure mitral regurgitation and sinus rhythm is seen in fig. 4. Again the three waves of the central venous pulse are seen clearly, and there is a characteristic high-climbing *v* wave.

In patients with auricular fibrillation the auricular contraction-wave is absent, and each cardiac cycle begins with an initial abrupt rise of pressure synchronous with the beginning of ventricular systole. Records from 2 patients, of whom one had auricular fibrillation and mitral stenosis, and the other auricular fibrillation and mitral regurgitation, are shown in figs. 5 and 6 respec-

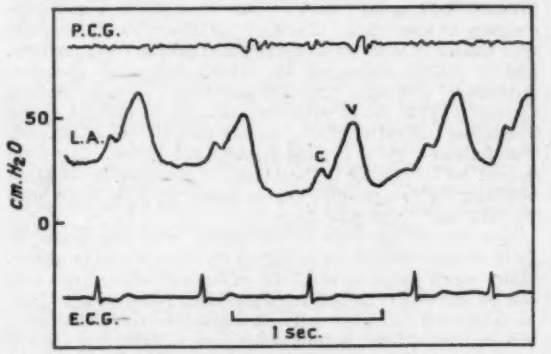

Fig. 6—Left-auricular pressure in a patient with mitral regurgitation and auricular fibrillation.

tively. These also show the increase in height of the *v* wave relative to the remainder of the pressure-pulse contour when a regurgitant stream is present.

We do not claim that all cases may be divided strictly into two groups, those with stenosis and those with regurgitation, because many patients have mixed lesions. A record from such a patient, in sinus rhythm, is seen in fig. 7. On clinical and radiological findings this patient appeared to have pure mitral stenosis, but at operation "there was a small regurgitant stream to be felt, coming through the mitral valve." Although some regurgitation was suggested by the high *v* wave of the pressure-pulse contour, it was impossible to assess the degree. However, the occurrence of the mixed lesion of mitral stenosis and regurgitation appeared to be more common in the group with auricular fibrillation. In accord with this Little (1951) thought that, where the ventricular contraction is not immediately preceded by an auricular contraction, regurgitation into the auricle always takes place. However, it seems possible that this depends to some extent on the length of the previous diastole.

In many patients with both stenosis and regurgitation the pressure tracing in the left auricle remains constant in successive cycles, each wave form being a replica of the preceding one and a pattern for the one to follow, but occasionally, it seems, regurgitation may occur in one cycle and not in another, with the result that the wave contours vary. Such a record is seen in fig. 8, in which cycle 1 is typical of mitral stenosis, whereas cycle 2 suggests regurgitation. Closer examination shows that the left-auricular pressure-cycle 2 with the high-climbing *v* wave typical of mitral regurgitation is immediately preceded by a relatively long diastole, and cycle 1 in keeping with mitral stenosis is preceded by a short diastole. It seems that in this particular patient there was an appreciable regurgitation through the mitral valve during ventricular contraction when this followed

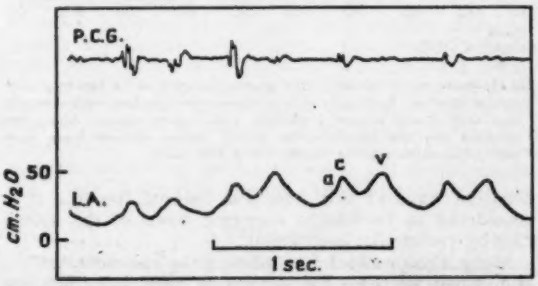

Fig. 7—Left-auricular pressures in a patient, with mitral stenosis and sinus rhythm, in whom a small regurgitant stream was found at operation.

a long diastole. Wiggers and Feil (1922) produced evidence which supports this when they found that "The regurgitation is definitely increased in slow beats." Thus we infer that a patient with mitral stenosis may have an incompetent valve when the heart is beating slowly, though this may not be so when the heart is beating quickly. Here is obviously a matter for further investigation.

After examination of the form of the tracings a quantitative study was attempted to see if a finer distinction could be made between stenosis and regurgitation. Pressures were measured at two points: the z point (Werle et al. 1942) corresponding to the beginning of ventricular systole—i.e., the beginning of the *c* wave—and the top of the *v* wave. These were chosen because it was thought that the difference between them, if great, would indicate the presence of regurgitation, for the auricular pressure in mitral incompetence rises during this interval. The presence or absence of the

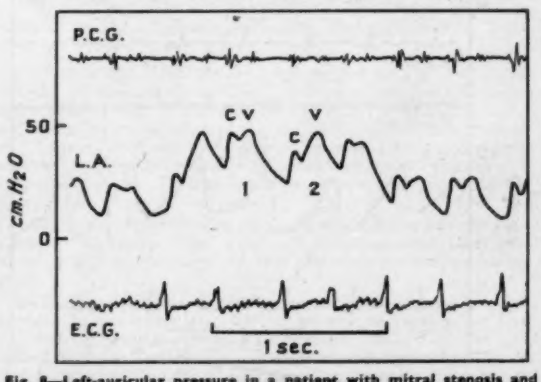

Fig. 8—Left-auricular pressure in a patient with mitral stenosis and auricular fibrillation, showing cardiac cycle 1 typical of mitral stenosis and cardiac cycle 2 typical of regurgitation.

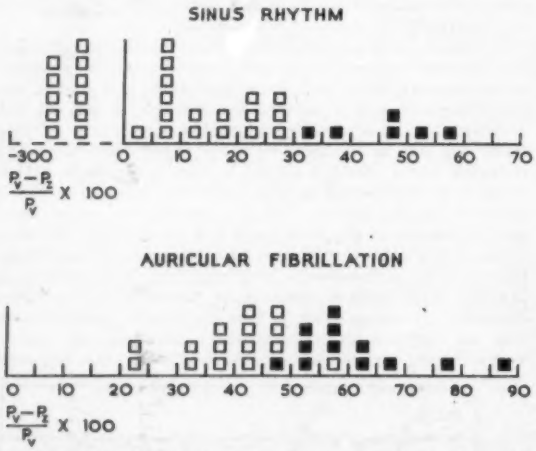

Fig. 9—Analysis of left-auricular pressure-curves of 61 patients with mitral disease. Each open square represents a patient with stenosis, and each closed square a patient with regurgitation. Along the abscissa are the left-auricular mitral values derived from each patient's pressure-curve (explained in the text).

negative wave at this time was ignored, because it is considered to be due to dragging down of the valve-ring by ventricular contraction.

Many things affect the pressure in the left auricle; and, when all these are subject to variation from one patient to the next, it is difficult to assess the part played by any one of them in a group study. With our manometers calibrated against an atmospheric zero levelled to the manubrium sterni it was obvious that respiration would affect the pulse contour, with the result that different points on the same cardiac cycle would be affected by different intrathoracic pressures. To circumvent this difficulty all the measurements were taken from a cardiac cycle in an expiratory pause.

Other factors affecting the pressure in the auricle are the volume of blood contained in the pulmonary vein-

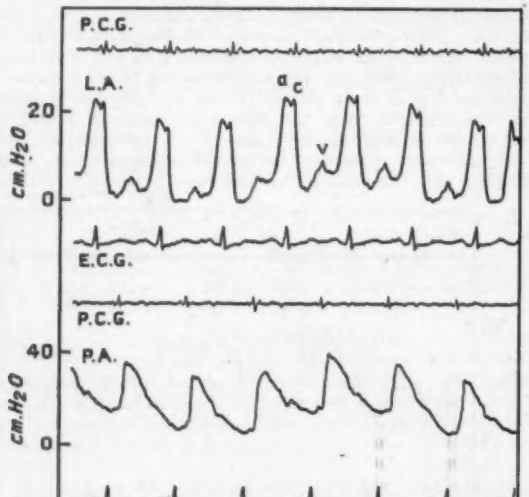

Fig. 10—Left-auricular and pulmonary-artery pressures in a patient with mitral stenosis and neurosis, showing said pressures within normal limits.

auricle system, the rate of flow of blood to the auricle, the volume-elasticity coefficient of the left auricle, and the systemic arterial and left-ventricular pressures. From patient to patient these factors vary independently of the presence of regurgitation and would mask any attempt to indicate this regurgitation by the direct comparison of records from different patients.

This difficulty has been largely overcome by expressing the difference between the pressures measured at the top of the *v* wave and the z point ($P_v - P_z$) as a percentage of the pressure at the top of the *v* wave (P_v). Thus we obtain the expression $\frac{P_v - P_z}{P_v} \times 100$. This provides us with a number which we have called the left-auricular mitral value. This is related to the pressures at the *v* and z points but is little affected by the individual patient variation which occurs in both numerator and denominator and, to some extent, is cancelled out.

The figure from this expression was worked out from the left-auricular pressure-pulse curves of 61 patients with mitral disease where the diagnosis was confidently determined.

Fig. 9 shows the results of this analysis. In patients with sinus rhythm, stenosis is clearly distinguished from regurgitation by the left-auricular mitral values. In the group with a left-auricular mitral value of 25–30 one patient (see fig. 7) had a value of 29 and yet had a small regurgitant stream at operation, being the only one in this group to have any regurgitation at all.

Fig. 9 also shows the results from patients with mitral disease and auricular fibrillation. At first sight it appears that the distinction between those with stenosis and those with regurgitation, as one would expect, is not clear-cut. One patient, although having fibrillation and a mitral value of 52, had a qualitative left-auricular pressure-tracing like that of pure stenosis and had pure stenosis at operation. Another patient, with fibrillation, who clinically and radiologically had mitral regurgitation, had a mitral value of 49, which indicated stenosis. However, although the left-auricular pressure-tracing showed a rapid heart with the majority of cardiac cycles indicating mitral stenosis, an occasional longer diastole was followed by a typical regurgitant curve. It would indeed be surprising if there were a clear-cut distinction between the two conditions, for many patients have both stenosis and regurgitation.

The above analysis is obviously very empirical in spite of the attempt to justify it by simple mathematics. Many more patients must be examined before its value can be assessed. Mitral regurgitation, when present, can be diagnosed clinically and radiologically in most patients, but in some there is uncertainty or a firm diagnosis is subsequently found to be inaccurate. It remains to be seen if the method described above extends the possibilities of diagnosis into this latter group.

That this simple technique is useful in assessing the postoperative progress of patients after mitral valvotomy is certain. The patient whose symptoms recur may be working too hard, he may have progressive pulmonary vascular disease, or the valve may be narrowing again. Puncture of the left auricle is a quick and reliable way of deciding between these and other possible explanations, for a raised pressure will surely indicate recurrent stenosis.

A third use for this technique, not entirely separate from the above-mentioned, is to help to differentiate patients in whom the mitral lesion is not responsible for all the symptoms. A normal low left-auricular pressure is a contra-indication to operation on the mitral valve as in the following case:

A married woman, aged 38, complained of a gripping chest pain, breathlessness, dizziness, fainting attacks, and swelling of the face, hands, and ankles. The breathlessness was said to make it difficult for her to walk far and impossible to look

after her child and to do the housework. Physical and radiological examinations showed that the patient had mitral stenosis, but her family history gave grounds for an additional diagnosis of neurosis. The patient had been divorced, had a second unhappy marriage, and been separated again; at the time of examination she was living with a third man. Against her wish her child had been removed from her care while she was in a convalescent home. Each major crisis in her life had produced "a severe heart attack" with pain down the left arm and "loss of consciousness." To assess the severity of the mitral stenosis and so of the relative importance of this lesion in the production of the symptoms the left-auricular pressure and the pulmonary-arterial pressure were recorded (fig. 10). These pressures were considered to be within normal limits. The patient did not undergo operation.

On more than one occasion this simple examination has been the deciding factor in distinguishing the cardiac neurotic from the patient with mechanical obstruction.

Summary

The technique of measuring blood-pressure by puncturing the left auricle through a bronchoscope has been extended to puncturing the aorta and the pulmonary artery. Typical pressure-pulse contours from these vessels are shown.

The value of the method of direct measurement of pressure in the left auricle through the bronchoscope is discussed.

A simple method of analysis of the left-auricular curve is given. In 59 of 61 patients the method was correct in its forecast of the presence of stenosis or of regurgitation.

It is concluded that, in mitral disease, the left-auricular pressure-curve is useful in the differentiation between stenosis and regurgitation, to follow the post-operative course, and to distinguish those patients in whom the pathological mitral valve is not the major cause of the symptoms.

POSTSCRIPT

Since we wrote this paper we have discovered that Euler (1949) punctured the pulmonary artery through the bronchoscope and injected radio-opaque material in man. Euler (1950) also used this method of puncture to obtain mean pulmonary-artery pressures from patients in the sitting position. He allowed the blood to rise in a glass tube attached to the puncturing needle and then measured the height of the column of blood.

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". . . The expression of independent medical opinion by Medical Officers of Health was of particular value when the interests of health were in conflict with those of Real Property. . . . Despite the coming of the National Health Service with its nationwide provision of curative medicine the health of the people is still capable of improvement by preventative measures and Local Authorities are charged with instituting these. In doing this the Authorities are likely to be confronted with new problems much more complex and difficult than those overcome in the improvement of Environmental Hygiene. Opposing interests may be encountered less easy of definition and with much deeper ramifications than those vested in Real Property. It is, therefore, more imperative than ever that Medical Officers of Health should appreciate that they are under a statutory, as well as a moral, obligation to express independent medical opinion where this might in any way benefit the community they serve."—Dr. G. A. W. NEILL, medical officer of health for Barnsley, in his report for 1953.

ESTIMATION OF LIVER FUNCTION BY CHOLANGIOGRAPHY

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No laboratory test of liver function is by itself reliable, and the multiple testing which is now done routinely is laborious, expensive, and time-consuming. We have therefore investigated the possibilities of using cholangiography to estimate liver function. The contrast medium used was 'Biligrafin' (disodium-N-adipic-di- 3 amino 2 : 4 : 6-triiodo-phenylcarbonate), and the function of the liver was assessed by observing the concentration and rate of excretion of this dye in the biliary tract. The observations were then compared with the results of multiple laboratory testing on blood and urine samples taken during the radiographic examination.

Technique

An intravenous test dose of 1 ml. biligrafin was given, and followed after fifteen minutes by an intravenous injection of 20 ml. of the dye. None of our patients had any reaction to the test dose. After the 20-ml. injection 3 complained of nausea, but only 1 actually vomited. A 4th began to sneeze violently: this effect, noted by Orloff et al. (1954), may be a mild allergic reaction. The best radiographs were obtained if the patient's colon had previously been emptied with a bowel washout.

Films were taken in the prone and prone-oblique positions fifteen minutes after the injection. In patients who showed satisfactory excretion of dye the common bile and hepatic ducts were clearly seen. The origins of the right and left hepatic ducts and the intrahepatic branches were less clearly seen. Forty minutes after the injection films were taken in the same positions, and at this stage some concentration of dye was usually present in the gall-bladder. One or two hours after the injection films were taken in the prone and erect positions.

Assessment of Radiographic Findings

The concentration of the dye was estimated from the density of the shadow produced radiographically.

If the density of the dye in the common bile-duct (where it lay outside the liver shadow) was equal to the soft-tissue density of the adjoining liver, then the concentration was regarded as good. If the shadow of the dye was less than the adjoining liver shadow, and the outline of the bile-ducts could still be seen, then the concentration was considered to be only moderate. If no dye was seen in the biliary system throughout the examination, the concentration of dye was judged to be poor.

In 1 case no dye could be seen in the bile-ducts, but the gall-bladder had partly filled with dye fifteen minutes after the injection; the concentration was therefore considered to be good.

In healthy persons a good concentration of dye usually appears in the bile-ducts ten to twenty minutes after the injection (Hornykiewytsch and Stender 1953, Berk et al. 1954, Orloff et al. 1954). No case in this series showed evidence of delayed excretion (such as is sometimes seen in urography) and the assessment of the density of the dye shadow was made on films taken fifteen minutes after the injection.

Assessment of Laboratory Findings

The results of the multiple laboratory testing were arbitrarily classified as follows:

Normal Liver Function.—Results within the ranges shown in the accompanying table.

Slight Impairment of Function.—Normal albumin/globulin ratio. Some increase in total globulin. Slightly raised thymol turbidity and gamma turbidity.

Moderate Impairment of Function.—Reversed albumin/globulin ratio. Slightly raised thymol turbidity and gamma turbidity.

Severe Impairment of Function.—Reversed albumin/globulin ratio. Markedly raised thymol turbidity and gamma turbidity.

This arbitrary classification was adopted for the sake of simplicity. We tended to ignore the results of the extremely sensitive cephalin cholesterol flocculation test, which may be positive in very minor degrees of impaired

—	Total protein (g. per 100 ml.)	Albumin/globulin ratio	Thymol-turbidity units	Thymol-flocculation	γ-turbidity units	γ-globulin (g. per 100 ml.)	Cephalin cholesterol flocculation test	Takata-Ara test	One-minute bilirubin (mg. per 100 ml.)	Total bilirubin (mg. per 100 ml.)	Cholinesterase (pH per hour)	Cholinesterase (%)	Plasma alkaline-phosphatase (King-Armstrong units)	Serum-paper electrophoresis	Urine bilirubin	Urine urobilin	Pathological assessment	Radiological assessment
Normal Range	6·0–8·5	1 : 1–3 : 1	0–2	Negative	Max. 6 units	Max. 1·31	0–1 plus	Negative	Max. 0·25	Max. 1·5	0·70	100	5–10		Nil	Nil Trace		
Cases																		
1	9·6	1·0/1·1	6	++	15·6	2·78	++	Neg.	0·02	0·15	0·36	52	..	Marked increased γ-globulin	Nil	Trace	Moderate impairment	Faint excretion at 15 min.
2	8·1	1·3/1·0	2	Neg.	8·5	1·7	..	..	0·02	0·20	0·70	100	..	Normal	Nil	Slight excess	Slight impairment	Normal excretion
3	8·7	1·0/1·4	12	+++	15·3	2·72	+++	++	3·20	4·60	0·57	82	14·9	Increase in β- and γ-globulin	+++	Nil	Severe impairment and obstruction	No dye excreted
4	8·2	1·1/1·0	1	Neg.	10·2	1·96	Neg.	Neg.	0·02	0·10	0·79	113	6·2	Slight increase in β- and γ-globulin	Nil	Trace	Slight impairment	Normal excretion
5	8·8	1·1/1·0	2	Neg.	10·4	1·97	++	Neg.	..	..	0·43	61	26·6	Slight increase in β- and γ-globulin	Nil	Trace	Slight impairment with slight obstruction	Faint excretion at 15 min. Urogram at 40 min.
6	8·0	1·2/1·0	1	Neg.	7·6	1·54	Neg.	Neg.	0·05	0·45	0·84	120	..	Normal	Nil	Trace	Normal	Normal excretion
7	9·7	1·0/1·0	8	+++	6	2·38	++	Neg.	0·23	0·80	0·70	100	12·3	Increased γ-globulin	Nil	Trace	Moderate impairment	Faint excretion at 15 min.
8	7·9	1·0/2·3	7	++	19·4	3·35	++	++	0·13	0·55	0·54	77	..	Increased γ-globulin, decreased albumin	Nil	Trace	Severe impairment	No excretion. Urogram at 15 min.
9	8·4	1·1/1·0	2	Neg.	9·5	1·07	+	Neg.	0·05	0·25	0·58	83	..	Slight increase in β- and γ-globulin	Nil	Trace	Slight impairment	Normal excretion
10	8·4	1·5/1·0	1	Neg.	5·5	1·24	Neg.	Neg.	0·02	0·20	0·58	83	..	..	Nil	Trace	Normal	Normal excretion
11	9·0	1·2/1·0	2	Neg.	8·0	1·62	Neg.	Neg.	0·10	0·25	..	..	..	Moderate increase in β-globulin	Nil	Trace	Slight impairment	Normal excretion
12	8·2	1·5/1·0	1	Neg.	5·1	1·18	..	Neg.	0·10	0·40	0·78	110	..	Normal	Nil	Nil	Normal	Normal excretion
13	8·9	1·4/1·0	2	Neg.	7·0	1·47	++	Neg.	..	..	0·87	124	..	Slight increase in β- and γ-globulin	Nil	Nil	Normal	Normal excretion
14	7·0	1·0/1·0	4	Neg.	10·8	2·04	++	+	0·02	0·21	0·70	100	..	Normal	Nil	Trace	Slight impairment	Dye in gall-bladder at 15 min. Good concentration at 1 hr. Ducts not seen
15	8·9	1·0/1·1	4	+	14·1	2·56	Neg.	++	0·05	0·40	0·57	82	..	Increased γ-globulin	Nil	Nil	Severe impairment	No dye excreted
16	7·1	1·7/1·0	1	Neg.	3·9	0·99	Neg.	Neg.	0·05	0·50	0·99	142	..	Normal	Nil	Nil	Normal	Normal excretion
17	5·9	1·7/1·0	1	Neg.	3·2	0·89	Neg.	Neg.	0·03	0·15	0·76	109	..	Normal	Nil	Nil	Normal	Normal excretion
18	7·5	1·3/1·0	2	Neg.	7·4	1·53	Neg.	Neg.	0·03	0·40	0·70	100	..	? Slight increase in globulin	Nil	Trace	Normal	Normal excretion
19	7·9	1·3/1·0	2	Neg.	11·2	2·12	Neg.	Neg.	0·03	0·35	1·02	146	..	Normal	Nil	Trace	Slight impairment	Normal excretion
20	7·7	1·0/1·0	6	++	13·0	2·38	++	+	0·43	0·80	0·99	141	..	Slight increase in γ-globulin	? Trace	Trace	Moderate impairment	Faint excretion at 15 min.
21	7·4	1·1/1·0	1	Neg.	7·4	1·53	+	Neg.	0·15	0·20	0·96	137	..	Normal	Nil	Trace	Normal	Normal excretion
22	7·3	1·0/1·4	2	Neg.	6·7	1·44	Neg.	Neg.	0·55	1·05	0·65	141	..	Slight increase in γ-globulin	+	Trace	Moderate impairment with slight obstruction	No dye excreted
23	8·3	1·0/1·1	1	Neg.	8·2	1·64	Neg.	Neg.	0·05	0·45	0·99	141	..	Slight increase in β- and γ-globulin	Nil	Nil	Slight impairment	Normal excretion
24	7·0	1·9/1·0	1	Neg.	3·0	0·86	Neg.	Neg.	0·05	0·20	0·97	139	..	Normal	Nil	Trace	Normal	Normal excretion
25	7·3	1·2/1·0	1	Neg.	6·8	1·44	Neg.	Neg.	0·10	0·50	0·84	120	..	Normal	Nil	Nil	Normal	Normal excretion
26	6·5	1·1/1·0	3	Neg.	9·8	1·89	Neg.	Neg.	1·85	3·65	0·52	74	106·0	Slight increase in γ-globulin	+++	Trace	Slight impairment with marked obstruction	Faint excretion into hepatic ducts. Urogram at 15 min.
27	6·8	1·3/1·0	1	Neg.	4·6	1·10	Neg.	Neg.	0·02	0·30	0·58	83	..	Normal	Nil	Trace	Normal	Normal excretion
28	7·6	1·3/1·0	2	Neg.	5·9	1·3	++	Neg.	0·02	0·38	0·91	130	..	..	Nil	Trace	Normal	Normal excretion
29	8·4	1·0/1·2	1	Neg.	11·0	2·08	Neg.	++	1·30	2·40	0·71	101	17·4	..	+++	+++	Moderate impairment with obstruction	No dye excreted. Urogram present at 15 min.
30	7·1	1·0/1·6	16	+++	18·6	3·41	+++	+++	0·65	1·90	0·17	24	21·8	..	+	++++	Severe damage with cirrhosis	No dye excreted. Urogram present at 15 min.

liver function, unrelated to the main pathological condition. We attached significance to the Takata-Ara test only when it was strongly positive. The serum-bilirubin values, the cholinesterase values, the findings in the paper-electrophoresis studies, and the urinary observations were all used to confirm the conclusions reached on the above broad criteria. Plasma alkaline-phosphatase estimations were made only if jaundice was suspected clinically; and a raised value was taken as confirmatory evidence of an obstructive element.

Correlation of Findings

30 patients were investigated. Specimens of blood and urine were obtained immediately before injecting the dye.

12 patients were judged to be "normal" both by the laboratory tests and radiographically; but 7 judged radiographically to be normal were assessed biochemically as having "slight impairment" of liver function, in view of slightly raised thymol and gamma turbidity associated with normal albumin/globulin ratio. In each of these cases the globulin was absolutely increased, and often there was increased gamma-globulin. Thus cases of slight impairment of liver function cannot be diagnosed by radiography alone.

In 3 cases judged biochemically to have "moderate impairment," the dye showed faintly on films taken at fifteen minutes. In 4 cases of "severe impairment" no excretion of dye was demonstrated radiologically.

Each of 2 cases of "slight impairment" with some evidence of obstruction showed poor excretion at fifteen minutes.

In 2 cases in which the laboratory data indicated both obstruction and "moderate impairment" of liver function, no excretion of biligrafin was demonstrable radiographically, although a urogram showed excretion at fifteen minutes in 1 instance. (We apply the term "obstruction" not only to obvious "surgical" blockage but also to the obstruction which results from intrahepatic œdema in the early stages of hepatitis.)

Summary

30 cases on whom cholangiography was performed were subjected also to routine laboratory testing of liver function. The rate of excretion and the concentration of the dye, demonstrated radiographically, were correlated with the laboratory findings in an attempt to assess the value of cholangiography as a means of estimating liver function.

Of 19 cases judged radiographically to show good excretion of dye by the liver, 12 were shown by laboratory tests to have normal liver function and 7 to have slight impairment of liver function. It was concluded that slight impairment of liver function is not detectable radiographically.

Moderate degrees of liver damage present in 3 cases showed exact laboratory and radiographic correlation.

4 cases showing severe liver damage also revealed exact laboratory and radiographic correlation.

In cases with some degree of biliary obstruction the radiographic findings suggested a greater degree of hepatic insufficiency than was indicated by the laboratory data.

It was concluded that a broad estimate of liver function can be made from cholangiography alone.

We should like to acknowledge the technical assistance of our laboratory and radiographic staffs.

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EARLY CLINICAL DIAGNOSIS OF CONGENITAL DISLOCATION OF HIP

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Two simple clinical tests should make the examiner certain either that a congenital dislocation of the hip is absent or that an abnormality is present which needs radiological confirmation.

Typically, congenital dislocation of the hip is characterised by a limp, a short leg, and a raised great trochanter in an infant aged 18 months, but these features may be slight and the range of movement of the affected hip apparently full.

During infancy and before weight-bearing in a case of congenital dislocation of the hip the femoral head is

Fig. 1—Hips and knees flexed, showing short right leg.

usually only partly dislocated. The average age at which the dislocation becomes complete is not known (apart from the rare atypical dislocation which is complete at birth and is usually associated with other congenital deformities).

The infrequency of congenital dislocation of the hip in England does not justify radiography of every baby at birth as in some parts of Italy. But the two simple clinical tests described here can be applied to decide whether radiography is necessary or not.

FIRST TEST

The infant should be laid flat on its back with its knees fully flexed and its hips flexed to 90° (fig. 1). In

Fig. 2—Abduction of flexed hips, showing limitation of abduction of right hip.

this position, if there is unilateral dislocation of one hip, one knee will be seen to be higher than the other. Next, the knees are widely abducted. In a normal infant in this position the hips can be abducted about 80° each. Limitation of abduction in this position is an early and constant clinical finding in congenital dislocation or subluxation of the hip (fig. 2) and points to the need for radiography of the hips.

SECOND TEST

In the newborn the ligaments and muscles may be lax, and on full abduction of the flexed hips an audible, visible, and palpable jerk or snap is noticed (Ortolani's "sign of the jerk")—i.e., the femoral head slips over the posterior rim of the acetabulum.

COMMENTS

It should be the aim of all pediatricians, obstetricians, and practitioners to diagnose congenital dislocation of the

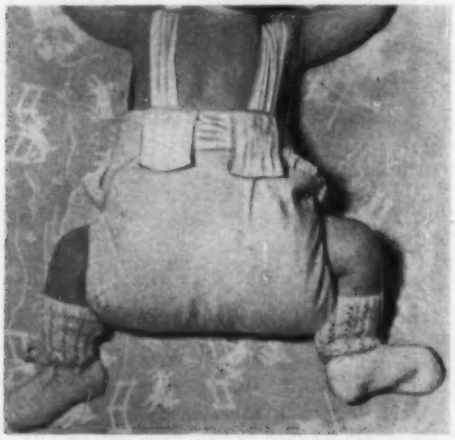

Fig. 3—Frejka's abduction pillow-splint.

hip at the earliest opportunity. These two simple tests will enable them to diagnose all the cases. A few infants with limitation of abduction of the flexed hips do not go on to dislocation, but no infant with congenital dislocation of the hip does not show one of the two signs.

Putti obtained excellent results in 95% of infants aged less than 1 year. In this country, where most cases are diagnosed at the age of 1 or 2 years, the best results do not approximate 80%, and the older the child the worse is the result.

Two of my cases were diagnosed at the age of 3 months: one by a good general practitioner who knew of the abduction sign, and the other by a nurse who had difficulty in abducting the baby's legs to put on a diaper and therefore called the pædiatrician's attention to it.

Treatment in the first few months of life by a Frejka's abduction pillow-splint (in effect a broad thick diaper) (fig. 3) leads to a high percentage of cures by the time the infant is ready to walk, thus doing away with manipulations and prolonged plaster-of-paris splints when he should be running about.

If this flexion and abduction test were done on all infants at the age of 2 or 3 months, many of the orthopædic surgeons' problems on the treatment of these children in later years would be done away with, and a higher percentage of good results of treatment would be obtained. It is axiomatic that the earlier a congenital abnormality is discovered and treated the better is the cure.

SONNE DYSENTERY TREATED WITH TETRACYCLINE

A COMPARISON WITH PHTHALYL SULPHATHIAZOLE AND ORAL STREPTOMYCIN

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SONNE dysentery is usually mild and short-lasting, and clinical cure seldom presents any serious difficulty; but bacteriological cure is often difficult to obtain.

In the treatment of Sonne infections the sulphonamides have been widely used, in particular the poorly absorbed derivatives sulphaguanidine, succinyl sulphathiazole, and phthalyl sulphathiazole. Although it is generally accepted that there is a clinical response to these drugs, evidence of their effectiveness in producing a bacteriological cure is less convincing. Hawking and Lawrence (1950) have summarised many of the published reports of sulphonamide therapy, and Forbes (1953) has claimed prompt clinical and bacteriological cure of Sonne dysentery with oral streptomycin. In our experience treatment with succinyl sulphathiazole, phthalyl sulphathiazole, and oral streptomycin has proved disappointing because many patients continued to excrete *Shigella sonnei* after a full course of treatment with these drugs.

Finland et al. (1954) have published the results of clinical and bacteriological studies with the new antibiotic tetracycline. This was found to be less toxic and more active in vitro against *Sh. sonnei* than either aureomycin or oxytetracycline (terramycin). We have treated some cases of Sonne dysentery with tetracycline, others with phthalyl sulphathiazole, and others with oral streptomycin and compared the results. All the patients were treated as inpatients in the same infectious-diseases hospital.

Clinical Data

From March to August, 1954, 27 patients (26 with symptoms and 1 without) were treated with tetracycline, and 32 (28 with symptoms and 4 without) with phthalyl sulphathiazole. From June, 1953, to August, 1954, 25 patients (23 with symptoms and 2 without) were treated with oral streptomycin. The interval between the onset of symptoms and the beginning of treatment was 1–15 days (average 6 days) in the tetracycline group, 1–13 days (average 6 days) in the phthalyl sulphathiazole group, and 1–25 days (average 8 days) in the streptomycin group. The age-distribution is set out in table I.

TABLE I—AGE-DISTRIBUTION OF PATIENTS TREATED WITH TETRACYCLINE, PHTHALYL SULPHATHIAZOLE, AND ORAL STREPTOMYCIN

Age (yr.)	Tetracycline	Phthalyl sulphathiazole	Oral streptomycin
Less than 5	14	17	17
5–15	7	10	6
More than 15 ..	6	5	2
Total ..	27	32	25

The dosages of tetracycline and phthalyl sulphathiazole are shown in table II. The tetracycline was given in tablets, which were crushed and suspended with tragacanth for babies and children. The patients treated with oral streptomycin were given 0·5 g. twice a day regardless of age: 19 were treated for 3 days and 6 for 5–8 days.

Specific therapy was withheld until *Sh. sonnei* had been isolated from the stools. Treatment was considered to have been successful when the first six specimens taken after the end of treatment were negative for *Sh. sonnei*, and to have failed when *Sh. sonnei* was isolated from any of these specimens. In each group the interval between the end of treatment and the sixth negative specimen averaged 9 days, with a range of 6–16 days in the tetracycline and streptomycin groups and 7–14 days in the phthalyl sulphathiazole group. All the follow-up specimens were taken while the patients were still in hospital.

Bacteriological Methods

Fæcal specimens and, occasionally, rectal swabs were plated on to deoxycholate-citrate agar directly (Hynes 1942) and after overnight incubation in selenite broth (Hobbs and Allison 1945). *Sh. sonnei* was identified by colonial morphology on deoxycholate-citrate agar and by slide agglutination with S–R Sonne antiserum (Standards Laboratory).

Strains isolated from the tetracycline series were tested for sensitivity to tetracycline by a doubling-dilution technique in tubes. A stock solution of 2500 μg. per ml. of tetracycline hydrochloride in distilled water was prepared each week and kept at 4°C. Further dilutions were made in a medium of the following composition:

TABLE II—DOSAGE OF TETRACYCLINE AND PHTHALYL SULPHATHIAZOLE

Age (yr.)	Tetracycline		Phthalyl sulphathiazole	
	Regimen	Total dosage (g.)	Regimen	Total dosage (g.)
Less than 5 ..	125 mg. 6-hrly. for 7 days	3·5	0·5 g. 6-hrly. for 7 days	14
5–15	250 mg. 6-hrly for 7 days	7·0	1·0 g. 6-hrly. for 7 days	28
More than 15	500 mg. 6-hrly. for 7 days	14·0	2·0 g. 6-hrly. for 7 days	56

Peptone	2·0 g.
Sodium chloride	0·8 g.
Glucose	2·0 g.
Distilled water	100 ml.
pH adjusted to	7·6
Andrade's indicator	1·0 ml.

A series of doubling dilutions of tetracycline in 1 ml. volumes of this medium were prepared, and 0·02 ml. of a 1 in 100 dilution of a 24-hour broth-culture of *Sh. sonnei* was added to each tube. The sensitivity of the organism was taken to be the smallest final concentration of tetracycline that completely inhibited growth, judged by visible turbidity after 22–24 hours' incubation at 37°C. Strains isolated from the series treated with phthalyl sulphathiazole were tested for sensitivity to sulphathiazole by the disc technique described by Davies (1954).

Results

The results of treatment are summarised in table III. Treatment was successful in 26 of the 27 patients treated with tetracycline, in 11 of the 32 treated with phthalyl sulphathiazole, and in 9 of the 25 treated with oral streptomycin.

TABLE III—RESULTS OF TREATMENT WITH TETRACYCLINE, PHTHALYL SULPHATHIAZOLE, AND ORAL STREPTOMYCIN

Result	Tetracycline	Phthalyl sulphathiazole	Oral streptomycin
Success	26 (96%)	11 (34%)	9 (36%)
Failure	1 (4%)	21 (66%)	16 (64%)
Total ..	27	32	25

The strains isolated before treatment in 24 of the 27 cases treated with tetracycline were tested for sensitivity to tetracycline. All of them showed a uniform sensitivity to 4–8 μg. of tetracycline per ml. All the strains isolated during treatment showed a similar sensitivity. The Oxford staphylococcus was sensitive to 0·5 μg. of tetracycline per ml. A dosage of 0·5 g. of tetracycline 6-hourly produced serum-tetracycline levels of 4–5 μg. per ml. (Putnam et al. 1953) and fæces-tetracycline levels as high as 2230 μg. per g. of wet stool (Maynard et al. 1953).

In the phthalyl sulphathiazole group 31 of 32 strains isolated before treatment were tested for sensitivity; fourteen were sensitive and seventeen resistant to sulphathiazole. Davies (1954) tested strains of *Sh. sonnei* both by the disc technique and by inoculating about 150 viable organisms on to nutrient agar containing 5% lysed horse-blood and various concentrations of sulphathiazole. Strains recorded as sensitive by the disc technique were completely inhibited by sulphathiazole 1 mg. per 100 ml. by the other method; and strains resistant by the disc technique were not inhibited by sulphathiazole 50 mg. per 100 ml.

The results of sensitivity tests with streptomycin are not given, because only a few strains were tested.

Discussion

The number of patients, the age-distribution, and the interval between the onset of the disease and treatment were similar in each group. Although the tetracycline and the phthalyl sulphathiazole groups were strictly comparable, the streptomycin series differed slightly in that many of the patients were treated before March, 1954. Successful results were obtained in only a third of the patients treated with phthalyl sulphathiazole or with oral streptomycin, whereas only 1 failure was recorded in the 27 cases treated with tetracycline. From this patient a scanty growth of *Sh. sonnei* was obtained from a specimen taken on the second day after the end of treatment, but the following six specimens were negative without further treatment. However, in 1 case treated with tetracycline where twelve negative specimens were required before transfer to an institution, a scanty growth of *Sh. sonnei* was isolated from the twelfth specimen, although the preceding eleven were negative. This case has been classed as successfully treated because the first six specimens after the end of treatment were negative. In several of the patients treated with tetracycline the fæces were still positive on the 3rd and 4th days of treatment. We therefore feel that it would be unwise to reduce the duration of treatment to less than the 7 days that we have adopted. It is also possible that better results would have been obtained with oral streptomycin if the treatment had lasted longer. Most of our patients were given streptomycin for 3 days because this was the length of treatment used by Forbes (1953).

All the patients were nursed with full barrier technique, but reinfection may explain some of the failures (Vollum and Wylie 1946), though patients in all three groups were open to similar risks.

We found no toxic reactions to any of the drugs used. This confirms the low toxicity of tetracycline reported by Finland et al. (1954), but the number of cases that we have treated is small, and no special study of possible toxic effects was made.

Testing for sulphonamide sensitivity before treatment proved of little value in predicting the result of treatment with phthalyl sulphathiazole.

In 14 patients from whom sensitive strains were isolated before treatment there were 5 successes and 9 failures, compared with 5 successes and 12 failures in 17 patients from whom resistant strains were originally isolated. In 2 cases resistant strains were recovered after

treatment, although a sensitive strain had originally been isolated. It is uncertain whether this was due to the development of resistance during sulphonamide therapy or to cross-infection. The results of these sensitivity tests show that the failure of sulphonamide treatment in many of these cases cannot be attributed to sulphonamide-resistant strains.

Conclusions and Summary

In a small trial we have compared the values of tetracycline, phthalyl sulphathiazole, and oral streptomycin in the treatment of Sonne dysentery. Of 84 bacteriologically proved cases 27 were treated with tetracycline, 32 with phthalyl sulphathiazole, and 25 with oral streptomycin.

Treatment was successful in only a third of the patients who were given phthalyl sulphathiazole or oral streptomycin, whereas there was only 1 failure with tetracycline. Under the conditions of this investigation tetracycline proved superior to phthalyl sulphathiazole and oral streptomycin in effecting bacteriological cure.

All the strains of *Sh. sonnei* tested were sensitive to 4–8 μg. of tetracycline per ml. Sulphonamide-sensitivity tests were of little value in predicting the results of treatment with phthalyl sulphathiazole.

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RELIEF OF PAIN IN INCURABLE CANCER

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THE purpose of this article is to describe new and wider applications of intrathecal therapy for relieving the pain of incurable cancer.

Intrathecal therapy aims at selective cell destruction at the posterior root ganglia. Introduced by Dogliotti (1931) for sciatic pain, and developed by Saltzstein (1934) and Stern (1934), it was applied with great success by Greenhill and Schmitz (1935, 1936) and Greenhill (1947) to pelvic carcinoma. They used 0·75 ml. of absolute alcohol, which floated *upwards* to the ganglia. Complete relief of pain ensued in 60% of group III and IV cases, and partial relief in 10%.

Last year it occurred to me that it would be an advantage to use a heavy "carrying solution," which could convey more than one destructive agent, thus increasing the therapeutic possibilities. Moreover, a dense solution would be simpler to control—it is easier to lay a carpet than to paper a ceiling. Phenol and silver nitrate were the agents I employed, with glycerin or propylene glycol as the vehicle.

Injected intrathecally phenol can cause cord destruction. (This was the subject of a recent case in law.) If the phenol is held in glycerin, however, its diffusion is at a minimum, and when injected intrathecally it falls downwards (sp. gr. of glycerin, 1·25; sp. gr. of cerebrospinal fluid, 1·007). With the patient on his side (as for lumbar puncture) it falls to the posterior root ganglia of his lower half (fig. 1). Injected at the appropriate level it will usually cause permanent anæsthesia over the painful area. Fig. 2 shows the chief components influenced. Motor units are not affected, their cell station being well out of the way in the anterior horn. Further components affected lie in the posterior root ganglion itself. The aim is to select the group of smaller non-medullated C units of Erlanger et al. (1926). The large A type of proprioceptive units must be left intact. This depends on the concentration of the mixture, the optimum strength of phenol in glycerin being 1 in 18 to 1 in 20. Such a concentration appears to give the correct selection, affecting pain and touch fibres only, with loss of cutaneous sensation over the pain area—the only clear indication of relief. Cell selection in these circumstances is apparently on a size basis.

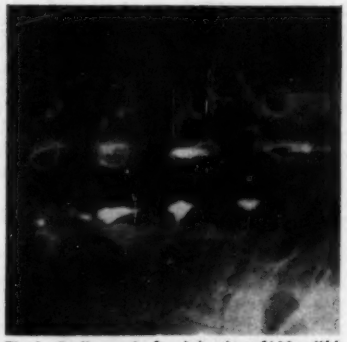

Fig. 1—Radiograph after injection of 'Myodil' (15 parts) and phenol (1 part). Resultant anæsthesia over 1st, 2nd, and 3rd ribs, and on inner side of arm, gave complete relief of pain.

Agents and Procedure

0·2–0·3 ml. of heavy cinchocaine hydrochloride ('Nupercaine') (the type used in spinal anæsthesia) was employed as a test agent.

1·0–1·7 ml. of 1 part of phenol in 18–20 parts of glycerin, well mixed with 0·1 ml. of sterile water per ml., was the agent used to provide permanent anæsthesia. (If more water is added the phenol is activated and requires dilution to half.)

1 ml. of gr. $^1/_{100}$ silver nitrate in glycerin was occasionally employed when phenol proved inadequate.

Largely for psychological reasons, the operation should be carried out at the bedside. For injection, the patient

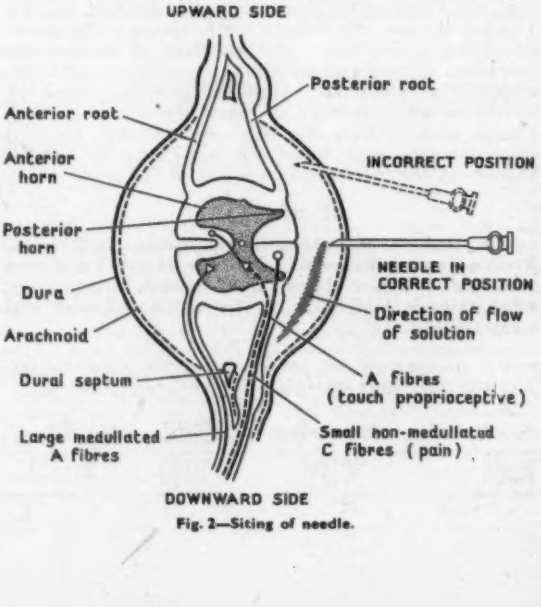

Fig. 2—Siting of needle.

lies on his painful side in the lateral lumbar-puncture position at the edge of the bed (fig. 3A). Puncture is often best performed in the sitting position, and for injection the patient is carefully lowered on to his side. Sacral intrathecal injection is an exception, the patient remaining seated for both puncture and injection.

The needle is moved forward carefully millimetre by millimetre, and once cerebrospinal fluid appears the needle is advanced 1mm. farther. This prevents injection of the agent into the subdural space, which might result from recession of the arachnoid following removal of C.S.F. If the patient experiences bilateral "root" pain the needle has been inserted too far, causing dragging of the nerve-roots from touching the cord. When C.S.F. flows, and before any injection is made, the patient is rotated backwards so that the needle and syringe point upwards at an angle of 45° with the horizontal (fig. 3B).

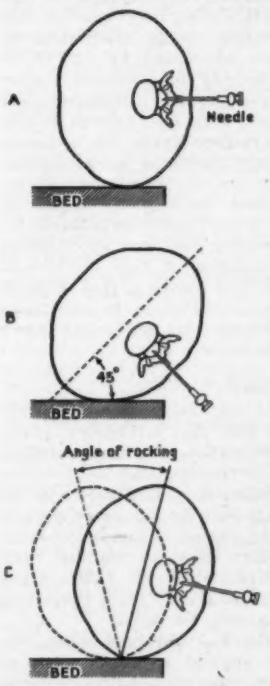

Fig. 3—(A) Initial position; (B) position for injection; (C) position after injection.

A preliminary test with nupercaine is made, primarily to ensure that the needle is not directed upwards (fig. 2 shows correct and incorrect positions). Using a 2-ml. syringe 0·2–0·3 ml. of heavy nupercaine is slowly injected. The patient is returned to the lateral lumbar-puncture position, and rocked gently (fig. 3C). Cutaneous sensory changes should appear on the patient's "lower" side; sensory loss on the "upper" side means that the needle is directed too far upwards (fig. 2), which would result in damage to the cord itself when the succeeding destructive agent is injected. If the preliminary test shows that the needle is incorrectly placed, the injection of phenol should be postponed for a day or two.

If analgesia is on the downward side, the 2-ml. syringe loaded with the phenol-glycerin mixture is then applied to the needle, with the patient rotated backwards at 45° as before (fig. 3B). 1·3 ml. is slowly injected, the syringe removed, and the stylet inserted. The patient is returned to the normal lateral lumbar-puncture position, and gently rotated backwards and forwards through this angle (fig. 3C). Sensation must be tested immediately, and if sensory loss is extending too far caudally the foot of the bed should immediately be held upwards by assistants to let the solution flow towards the cephalic end. Conversely, the head of the bed should be held up if sensory loss is spreading too high. A further 0·5 ml. of phenol mixture can be added if necessary.

After the phenol has been injected the needle is left in situ for one hour. If sensation returns, even in the form of analgesia, pain will almost certainly also return before long. In such circumstances the injection of gr. $^1/_{100}$ silver nitrate, dissolved in 1 ml. of glycerin, may successfully produce more permanent anæsthesia. Intensification is obtained by adding 1 in 500,000 methylsulphonal. The effect of adding hyaluronidase is being investigated.

At the end of the procedure the patient can be gradually raised. Plenty of fluids should be given, and sedatives as required.

Anæsthesia is at first widespread. In lumbar injections it often extends initially from lower abdomen to ankle, but settles later to an area from groin to upper tibia. It should overlap the pain area considerably. If the anæsthesia is still present at the end of five days its effect is probably permanent, and the patient should be allowed to go home, but if necessary the phenol injection can be repeated after a few days.

Site of Injection

Pain of Pelvic Origin

(*a*) Obturator and femoral distribution (groin, knee, and thigh). Injection is made in the twelfth dorsal and first lumbar interspaces.

(*b*) "Sciatic" type. Injection is made in the second or third lumbar interspace, and the solution allowed to flow caudally by slight elevation of the head of the bed.

(*c*) Sacral pain (carcinoma of rectum). Injection is made in the fifth lumbar and first sacral interspaces with the patient sitting upright on a pillow and held backwards by assistants. A second or two after injection he is pulled forwards so that the solution can reach the lower sacral roots in the tip of the dural sac. S.3, 2, and 1 units can be covered in cases of lower sciatic involvement if, when the tip of the dural sac is filled, the patient is rotated on to his side quickly.

Abdominal Pain from Carcinoma of Stomach, Pancreas, &c.

Injection is made at the appropriate level—often sixth or seventh dorsal interspace—and repeated after a few days on the other side.

Carcinoma of Lung

Injection is made at a level corresponding to the pain, and often at segments above and below.

Brachial and Cervical Pain from Primary or Secondary Carcinoma

Injection is at the fourth or fifth cervical interspace, and the solution is allowed to flow caudally by gently raising the head of the bed. Alternatively, it may be made at the second thoracic interspace, and the solution allowed to flow in the opposite direction with the patient's head itself elevated as much as possible.

After-effects are usually mild: at most they consist of headache and vomiting which pass off in a few hours. Brief aching in the affected area usually indicates success. Paresis of the leg occurred in 3 out of 22 pelvic cases, and was due largely to inexperience with the strength of the solution. Urinary incontinence was a temporary complication in the rectal group. Bedsores and burning have to be guarded against, and the patient should as far as possible always lie on the sound side.

Results

The regions affected in the 37 patients treated with intrathecal injections of phenol were: cervix (15 patients), rectum (5), genito-urinary tract (2), stomach (2), brachial and cervical region (6), and lung (7). Results were based on the patients' own statements, on clinical observation, and on the reductions which it was subsequently possible to make in the dose of their analgesic drugs. Of 19 successes now deceased, 6 obtained almost complete relief right up to the time of death. The remainder were relieved to within a few days of their death. The duration of relief varies: 1 case of carcinoma of the rectum obtained seven months' relief, and several have been relieved for six months. 8 of the 37 were apparently unrelieved: 4 had carcinoma of the cervix, 3 carcinoma of the bronchi, and 1 carcinoma of the stomach.

Advantages

(1) The method is simple, and with care it can be carried out in any hospital. For the patient it is a minor procedure.

(2) A series of ganglia can be influenced by increasing the quantity of phenol injected, and by tilting the patient. 3 patients were successfully given additional injections for involvement of new areas.

(3) Alternative sites of injection can be used—e.g., fourth and fifth cervical or second thoracic interspace, depending on whether the head or the foot of the bed is raised.

(4) It can be used for cervical, dorsal, lumbar, or sacral units.

(5) The method is safe; paresis, at the 1 in 18 strength, was slight. On the other hand, retention often lasted three weeks in rectal cases.

Conclusion

At the time of injection the criterion for relief was a fixed anæsthesia over the pain area. On this basis the cases were of two types:

Single nerve groups affected (e.g., obturator, sacral, or sciatic).

Combined nerve groups affected (e.g., obturator plus sacral or obturator plus sciatic, and some cases of carcinoma of lung).

In the first type the pain was easily relieved. In the second, however, it proved intractable. Even with nupercaine the anæsthesia was either fleeting or entirely absent. All were cases of advanced carcinoma, and in 6 the spine was involved. At necropsy 4 showed infiltration of the dura: phenol could not reach the carcinoma-encoated ganglia in these cases, but it did cause temporary anæsthesia of the emerging roots. Thus the hypothesis of pain from perineural lymphatic invasion (Way 1951) might also apply to the ganglia and dura. For uniform success, therefore, and since most cases follow the same pattern, a wide ganglion block should be carried out in the early stages of pain, before the growth has involved the ganglia.

Finally, in three extreme cases of very advanced carcinoma "released phenol," made by adding 0·4 ml. sterile water to 0·5 ml. of 1 in 30 phenol in glycerin, was used, and produced anæsthesia from waist to feet. Paralysis ensued in 1 case. Further research is proceeding on the possibility of producing selective spinal cord block without causing motor weakness.

Summary

37 cases of incurable cancer were treated by intrathecal phénol. Relief of pain was obtained in 29 cases.

Success apparently depended on whether single or combined nerve-groups were involved.

Phenol in glycerin or propylene glycol was used with success at all spinal levels, including the cervical region.

The immediate aim was to produce fixed skin anæsthesia over the painful area.

Spinal cord block was attempted in 3 instances, and gave relief.

My thanks are due to Dr. Ralston Paterson (director) and Dr. E. C. Easson, of the Christie Hospital and Holt Radium Institute, for referring patients to me; and to Dr. and Mrs. J. Starkie and Mr. F. Young for their invaluable help.

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CYCLOPROPANE, DENTAL EXTRACTION, AND SPARKS

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THAT sparks might be thrown off when a forceps fractures the enamel of a tooth during its extraction was not foreseen when cyclopropane as an alternative to nitrous-oxide anæsthesia was advocated by one of us (Bourne 1952, 1954a). Ignorance of this possibility seems to have been shared by others, and incredulity was expressed (Henry 1954) when Newton-Andrews (1954) reported that, while giving nitrous oxide, he had seen "a shower of sparks" plainly visible in a well-lighted surgery.

Though this occurrence may have been singular it contra-indicated the use of cyclopropane anæsthesia for dental extraction until the matter had been investigated (Bourne 1954b). The advantages of this method of anæsthesia and its successful trial over a period of years on more than 2000 patients prompted us to undertake such an investigation. We report here our investigation and suggest a simple safeguard.

Method

"... Enamel, the hardest substance produced in the body ... sparks with steel like flint" (Cowdry 1944). This fact can be easily demonstrated. We have obtained sparks, visible in daylight, by the application of dental forceps, made either of stainless or plated steel, to the crowns of extracted teeth, whether deciduous or permanent, whether molar, premolar, canine, or incisor, whether healthy or cavitated, whether filled or unfilled, and whether dry or wet with saliva and blood. (After a few applications the plating becomes erased from the biting surface of plated forceps, exposing the steel.)

The best display of sparks was obtained when fine root forceps were strongly applied to the crowns of healthy molar teeth and then were made to fracture the enamel. Though this manœuvre would seldom, if ever, be used in clinical practice it was the one used in experiments 1 and 2 (fig. 1).

Experiment 1: Influence of Oxygen on Sparking

In an atmosphere of carbon dioxide (which does not support combustion) sparks, viewed in the dark, appeared only as the slightest local redness. Occasionally a dull red particle was thrown off about an inch. In air (21% oxygen) the sparks were orange-red and were often seen to fly a foot or more. When oxygen was added to air, the number and brilliance of the sparks increased. In pure oxygen a shower of white sparks was obtained at almost every trial and with the greatest ease.

Experiment 2: Influence of Oxygen on Ignition

In this experiment we tested the ability of sparks produced with forceps and teeth to ignite various mixtures of cyclopropane, oxygen and nitrogen passing through a semitransparent rubber tube. The apparatus used is shown in fig. 1. The gas-flows were measured by rotameters, checked, and, where necessary, recalibrated with a Parkinson and Cowan gas-meter. The composition of the resulting mixtures was further confirmed by analysis by the method referred to below.

The tooth and forceps were manipulated by hand through the rubber (fig. 1). Owing to the imperfect transparency of this rubber only bright sparks were visible, even in the dark. These alone were taken into account in the results shown in the accompanying table. With the lower proportions of oxygen the cyclopropane concentration was adjusted to give mixtures which, according to Guest et al. (1952), were most easily ignited by an electric spark. The inflammability of each mixture that failed to be ignited by sparks from teeth

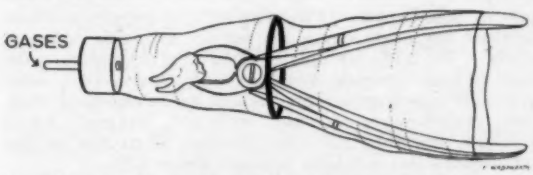

Fig. 1—Apparatus for testing ignition of gas mixtures by sparks produced with dental forceps and teeth. The gases comprising the mixtures were led to the apparatus through separate tubes.

and forceps was confirmed by igniting it with an induction-coil spark from electrodes passed into the apparatus.

Experiment 3: Ignition with Sparks from Dental Forceps and Grindstone

A dental forceps applied to a grindstone driven at high speed by an electric motor gives off a stream of sparks apparently in every respect far in excess of any that can be obtained with teeth. As expected, this was found to be a more effective means of ignition than was striking sparks with teeth. In this experiment the same apparatus was used as in experiment 2, except that the forceps and tooth were dispensed with, and the end of the tubing, which in experiment 2 gripped the forceps' handles, was now held open. The stream of grindstone sparks, directed through the opening, passed down the tubing to the end at which the gases were being delivered.

With this arrangement the mixtures listed in the table, down to and including that which contained 28% oxygen, were ignited at once. The mixture, however, which contained 25% oxygen, and other mixtures, not listed, with still less oxygen could not be ignited. Nor, with 25% oxygen, could mixtures in which the cyclopropane concentration was varied throughout the whole of its ignitable range be ignited by this method, though all of them were instantly ignited, during each test, by induction-coil sparks.

Experiment 4: Ignition of Cyclopropane in Nitrous Oxide

Using the grindstone method we were able to ignite a mixture consisting of 10% cyclopropane and 90% nitrous oxide. 10% cyclopropane in other mixtures in which oxygen was added at the expense of nitrous oxide were also ignited.

INFLUENCE OF OXYGEN ON IGNITION OF CYCLOPROPANE BY SPARKS FROM TEETH AND FORCEPS

Cyclo-propane (%)	Oxygen (%)	Nitrogen (%)	Ignited by sparks from teeth and forceps	No. of times sparks seen before ignition
20	80	..	Yes	0
35	65	..	Yes	0
45	55	..	Yes	9
15	60	25	Yes	4
16	40	44	Yes	50
9	34	57	Yes	10
8	30	62	Not with 100 sparks	..
8	28	64	(Not tested)	..
8	25	67	Not with 100 sparks	..

Experiment 5: Ignition of Ether and Divinyl Ether ('Vinesthene')

The vapour of each of these agents in oxygen was ignited with the greatest of ease by sparks from teeth. A mixture containing nitrous oxide and oxygen, at flow-rates of 6 litres and 2 litres respectively, which had passed over ether in a bottle, was ignited at once by grindstone sparks.

The results of our first three experiments suggested that, should sparks, such as we have produced experimentally, be formed during the extraction of teeth when cyclopropane had been administered, the likelihood of an explosion resulting would depend mainly on the concentration of oxygen present in the mouth at the time. To carry the investigation further, therefore, it was necessary to anæsthetise patients by the method under review and to measure the proportion of oxygen in the exhaled gases. This method of anæsthesia, described by Bourne (1954a), is as follows:

A rubber bag of about 6 litres capacity is filled with cyclopropane and oxygen in equal parts. The bag is connected to a face-piece by a two-way stopcock. The stopcock shuts off the bag and leaves open an aperture through which air is breathed while the face-piece is being adjusted over the patient's mouth and nose. When this has been done, the stopcock is turned, closing the air aperture and allowing the patient to breathe in and out of the bag. At the end of the administration the whole apparatus is removed from the face and the extractions are undertaken.

It was recommended by Bourne that the administration should be continued for about a minute; but, since we found that the amount of oxygen in patients' exhalations increased a little when the administration was prolonged, in the 13 patients we have examined we continued it for two or three minutes so that the oxygen would reach the highest levels possible.

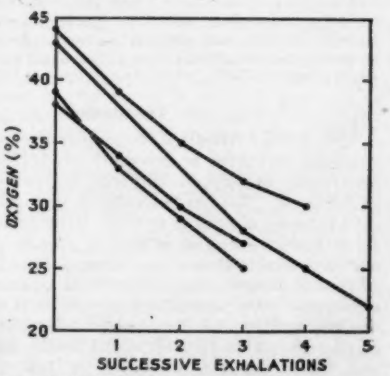

Fig. 2—Concentration of oxygen in successive exhalations of 4 patients breathing air after withdrawal of anæsthetic mixture (cyclopropane 50% with oxygen 50%).

From this description it will be realised that with this method of anæsthesia sparks could be struck only after the anæsthetic had been withdrawn; and only during an exhalation might the patient be in danger from an explosion due to this cause. We therefore analysed exhalations for their oxygen content.

Measurement of Oxygen in Patient's Exhalations

The samples of exhalations were drawn into syringes through needles passed through a rubber diaphragm in a specially prepared face-piece. The first sample was taken just before the end of the administration. At the end of the administration the anæsthetic was withdrawn by turning back the stopcock so that the bag was shut off. The patient then breathed air through the aperture while the face-piece was retained on his face. In this way we were able to continue to sample the exhalations from under the face-piece after known numbers of inhalations of air.

Cyclopropane 50% with Oxygen 50%

Of the 13 patients examined 7 were children, the youngest being aged 3 years. The oldest adult was aged 82. Since in clinical work some error in adjusting the flow-rates of the gases occurred, the contents of the bag were analysed before each administration. It was found that the oxygen varied between 46% and 54%. The results of this experiment are presented in fig. 2, which shows the values we obtained in 4 of these patients, including the 1 who gave the highest values. Usually, as expected, higher values were found in children than in adults.

Cyclopropane 50% with Oxygen 25% and Nitrogen 25%

A further series of 13 patients were anæsthetised in exactly the same way as those in the foregoing experiment; and just before the anæsthetic was withdrawn their exhalations were sampled. In these patients, however, 50% cyclopropane was administered not with oxygen but with oxygen and nitrogen in equal parts delivered from a cylinder containing this mixture. (At flow-rates of 750–1500 c.cm. per minute this oxygen-nitrogen mixture can be measured with sufficient accuracy through an oxygen rotameter.) As in the previous experiment and for the reason there given, the contents of the bag were analysed shortly before each administration. On one occasion they were found to consist of 42% cyclopropane and 29% each of oxygen and nitrogen. The oxygen, in fact, varied between 25% and 29%. We found that in

none of these patients did the oxygen concentration in any exhalation rise above 23%.

Analysis of Samples of Gas

The gases were analysed by a method based on Guthrie's (1921) apparatus for the analysis of air. The samples were passed directly into the capillary tubes of each of three absorbing vessels in series. The first contained concentrated sulphuric acid, the second sodium hydroxide, and the third an oxygen-absorbing solution. These absorbed cyclopropane, carbon dioxide, and oxygen in turn. As a measure of the accuracy of this method 10 analyses of air gave a mean oxygen percentage of 20·5% with a range of ±0·5%.

Discussion

The energy required to ignite cyclopropane-oxygen-nitrogen mixtures is inversely proportional to the concentration of oxygen and directly proportional to that of nitrogen. This has been shown precisely by Guest et al. (1952) using electrical energy. Our findings with sparks from forceps showed a similar trend. Furthermore, it seems probable from experiment 2 that the effectiveness of sparks from forceps, considered as a source of ignition, decreases with decreasing oxygen. If this is so, there are two influences both of which (should sparks be formed during the extraction of teeth) would make an explosion less likely when the oxygen is low than when it is high.

From our experiments we feel justified in concluding that the ignition of cyclopropane by sparks produced with forceps and teeth during extractions is unlikely when the concentration of oxygen in the mouth does not exceed 30%, and is improbable in the extreme when the concentration is 25% or lower.

The oxygen concentration in the exhalations of patients anæsthetised with 50% cyclopropane with 50% oxygen decreased to 25% only after a few breaths of air had been taken. During these few breaths, therefore, it would be wise to consider patients at risk from an explosion.

It might be thought that this danger could be avoided by asking the dental surgeon to wait until these breaths had been taken. But in our view this could not be relied on, since dental surgeons are wont not to pause at this stage. Or, again, it might be thought that the formation, during an extraction in normal clinical practice, of the sparks reported by Newton-Andrews (1954) was unique, and therefore this danger could be altogether ignored. Certainly the manœuvres we used to produce sparks experimentally were quite unlike any that might be used in practice. Nevertheless we believe that, under certain conditions, sparks could be produced. During the extraction, for example, of an upper molar tooth with a cervical cavity on the lingual side and with buccal and palatine roots inclined steeply away from one another, forceps tend to slip downwards towards the crown and may fracture the edge of the cavity. After several trials with extracted teeth we produced sparks in this way. We have produced sparks also when teeth simply broke, an accident which we have often seen in practice. Moreover, though sparks formed in clinical practice have not, so far as we are aware, been reported before the communication of Newton-Andrews, possibly they may have been produced but went unnoticed under normal lighting conditions. On the other hand, it might be argued that the risk is no less with ether or divinyl ether given with a large concentration of oxygen—a practice that, with divinyl ether at any rate, has been current for many years without, so far as we know, there having been reported an explosion caused in this way.

We conclude that, when cyclopropane, divinyl ether, or ether is administered with a large concentration of oxygen, the patient is momentarily at risk if extractions are made immediately after the mask has been removed. We therefore suggest that cyclopropane should be used not with oxygen but with a mixture of oxygen and nitrogen in equal parts. Cylinders of this oxygen-nitrogen mixture for medical use are readily available commercially. We have administered 50% cyclopropane with this oxygen-nitrogen mixture with results that were clinically indistinguishable from those we obtained when 50% cyclopropane was used with 50% oxygen. In 13 patients examined the concentration of oxygen in the exhalations did not then increase above 23%.

In conclusion, though detailed comment is outside the scope of this report, we draw attention to the fact that, when inflammable agents are used, the hazard we have investigated is probably, in any case, smaller than that from static sparks. Needless to say, therefore, precautions, which are now well known, should always be taken to avoid this latter danger.

Summary

Enamel, the hardest substance in the body, like flint, gives sparks with steel.

Experimentally we have produced sparks, visible in daylight, with teeth and dental forceps.

The number and brilliance of these sparks increased with increasing oxygen in the surrounding atmosphere.

With these sparks we ignited cyclopropane in oxygen. With decreasing concentrations of oxygen ignition became increasingly difficult. When the concentration of oxygen was as low as 30% we failed in a hundred consecutive attempts, at each of which good sparks were seen.

With sparks from teeth and dental forceps we ignited with great ease the vapour both of ether and of divinyl ether in oxygen.

A grindstone applied to dental forceps threw off a stream of sparks far in excess of any that could be obtained with teeth. With these sparks we ignited cyclopropane-oxygen-nitrogen mixtures with concentrations of oxygen as low as 28% but failed to ignite cyclopropane throughout its entire inflammable range with concentrations of oxygen that were 25% or less.

We concluded that, when cyclopropane is used, patients should be considered to be at risk from an explosion due to sparks from dental forceps and teeth if the oxygen in their exhalations exceeds 25%.

The concentration of oxygen in the exhalations of 13 patients anæsthetised with 50% cyclopropane in 50% oxygen by the method described by Bourne (1954a) was measured. It did not decrease to 25% until several breaths of air had been taken.

We suggest that, as a safeguard, 50% cyclopropane should be administered not with oxygen but with oxygen and nitrogen delivered from a cylinder containing these two gases mixed in equal parts. Such cylinders for medical use can be readily obtained commercially. The flow-rate of the oxygen-nitrogen mixture can be measured with sufficient accuracy with an oxygen rotameter.

With this mixture anæsthesia was clinically indistinguishable from that which we obtained when cyclopropane was used with 50% oxygen, and in 13 patients examined the concentration of oxygen in the exhalations did not increase above 23%.

We wish to thank Miss I. M. Young, lecturer in physiology, Sherrington School of Physiology, St. Thomas's Hospital, and Mr. N. Thurlow, senior technician there, for suggesting the method of gas analysis and for their helpful advice in its use.

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PREFRONTAL LEUCOTOMY
A CLINICOPATHOLOGICAL REPORT

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With a pathological report by

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FOR most of the mentally ill patients who come into the neurosurgeons' hands a restricted leucotomy or topectomy is now the operation of choice.

Clearly preferences for different forms of leucotomy should ultimately depend on a large series of detailed clinicopathological correlations, but not enough of such material is available. In these circumstances the publication of a single clinicopathological study is justified. Not only will it make a small contribution to the evidence available for a later analysis, but the difficulties of interpretation which become apparent when the clinicopathological correlations are discussed may usefully draw attention to those deficiencies in our present knowledge which most require investigation.

Careful analysis of published cases does not provide evidence sufficient to sustain the widespread and enthusiastic belief that a bimedial inferior cut is always the modified operation of choice. In this operation the section of the white fibres is in the usual plane but is limited as far as possible to the ventromedial quadrant of each lobe. It is sometimes called an orbital leucotomy. Further, in the present case full recovery from a *non-psychotic* mental illness followed a leucotomy in which these ventromedial segments virtually escaped damage. The clinical findings suggest that the improvement in this patient depended on personality changes. These were of a type which, in other patients, might bear no causal relationship to therapeutic success. In such patients they would be an irrelevant defect: in the present case, it is argued, they were essential to recovery.

Case-report

A married woman, aged 59, diagnosed as suffering from (i) tinnitus due to middle-ear disease, and (ii) a hypochondriasis with hysterical features, complained mainly of terrible head noises, palpitation, and weakness of the legs.

Family History.—Her father was an alcoholic who terrorised the family while in his cups. The only other child, her elder brother, was described as obsessional and eccentric. He was discharged from the Navy with neurasthenia and has at times drunk to excess. She had one adult daughter, who, like the patient's mother, was not known to be abnormal.

Personal History.—At the age of 4 she had measles followed by double pneumonia. Subsequently she was a fragile, nervous, and sensitive girl who was terrified of her father's alcoholic bouts. For 12 years she worked as a lady's maid, and at the age of 30 she married her childhood sweetheart, a chauffeur. Her married life had been happy. After the birth of her daughter she underwent appendicectomy and nephropexy. Otherwise she had been well.

Personality.—The patient described herself as "always rather pessimistic," but her husband characterised her as "rather a spark," and it seemed that she had been capable and hard-working but nevertheless full of life and gaiety. Although an extremely active woman, who was always bottling, preserving, and knitting, she was inclined to be excessively anxious over small matters and would arrive over early for trains. She was meticulous with her clothes and fussy about the house and would get upset if her routine were put out. Liable to headaches she was careful of her health. She had few interests outside her home and family, and her friends were chiefly those of her youth. Gardening, singing, and sketching were her hobbies.

Present Illness.—At the age of 25 an attack of "flu" left her with a ringing noise in the head, mainly in the left ear. This noise gradually lost its intensity and after a time became so faint that she could only hear it if she especially listened for it. 27 years later, at the age of 52, she had an attack of "gastric flu" with diarrhœa and vomiting, and after this the noises increased in intensity. They became worse and 4 years later were "intolerable."

On admission she described them as varying—sometimes like the reverberations of beaten iron, at others like clanging cymbals or the dragging of heavy chains. Often the noises were so loud that she could feel something hitting the inside of her head, which at times seemed to be jerked about. For a year or two she had felt weak, lifeless, and depressed, with the result that she could not attend to her normal household duties. Her legs were weak and tremulous. Palpitations were accompanied by a dreadful pain in the chest. Although she was constipated, her appetite remained good.

On examination she was well nourished, neat, and self-composed. She told her story with a wealth of circumstantial detail, and the house-officer noted that her mood was characterised by complacency rather than severe depression or emotional distress. Physically, apart from a chronic lesion of the right inner ear, there was no evidence of organic disease of the nervous system. She had hypertension (blood-pressure 250/130 mm. Hg) and arteriosclerosis.

Operation.—On Nov: 12, 1948, Mr. Harvey Jackson carried out a standard prefrontal leucotomy.

Postoperative State.—Immediately after the operation the patient was grossly confused. She had urgency and incontinence. Her confusional state resolved rapidly, and after a short convalescence she returned home much less worried by her noises but distinctly apathetic.

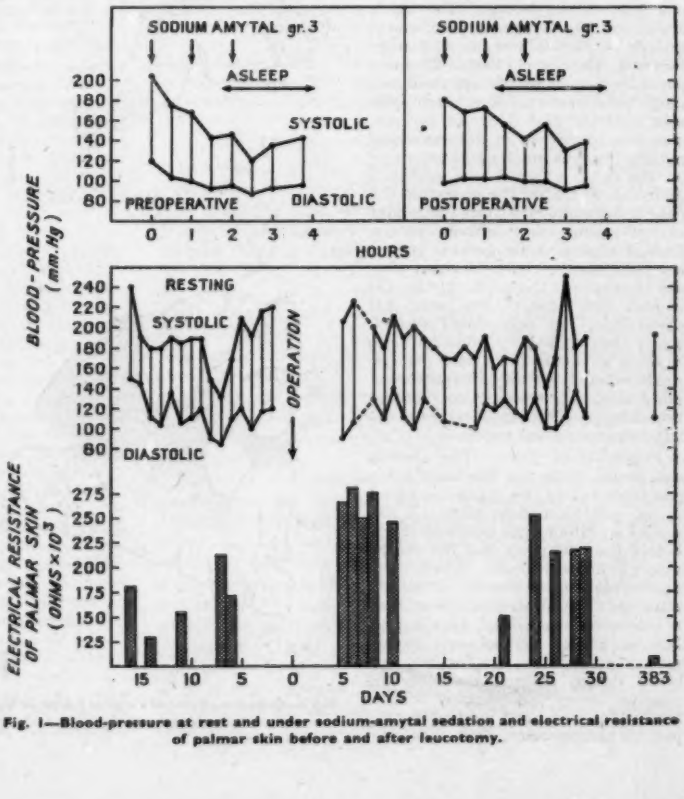

Fig. 1—Blood-pressure at rest and under sodium-amytal sedation and electrical resistance of palmar skin before and after leucotomy.

Follow-up.—3 months after the operation a home visit disclosed that she was more alive and interested. She was using make-up again and planning her future wardrobe in a sensible manner. Only once had she been incontinent, but she had been troubled by some urgency. Her husband and her daughter were both very pleased with her progress, finding her unworried and placid but very lazy. She was helping little with household tasks and mostly sat about doing nothing. She had done some shopping in a competent manner, but she herself noticed that she was "slower on the uptake," and her daughter found her distinctly forgetful. Her appetite was excessive. A year after the operation her husband reported that she was still improving. She concentrated better and was taking the initiative in such matters as altering her own clothes and mending her husband's. Her cooking was good but plainer, and she still occasionally forgot to put salt in the potatoes. She found it difficult, moreover, if she was put out of her routine—e.g., if someone extra came to a meal, or if her daughter tried to persuade her to try a new recipe. She enjoyed going out more than she had done for the past 6 or 7 years, but in the cinema she became lost if the plot was complex. Of her tinnitus she said: "I have those noises but I can't be bothered with them." Her husband thought that her personality was improved and she was not an invalid in any way: "If she could sleep more and eat less, she would be no problem at all." 6 months later she was still happy-go-lucky, did not appear to bother about anything, and when warned by her husband about leaving her bag in the shops she replied "If I lose it I lose it." In June, 1950, she had what was probably a small cerebrovascular accident, which was followed by an increase in her apathy and a further impairment of her powers of memory and concentration. In December, 1952, she died of cardiac rupture.

Electro-encephalography.—Before the operation the electro-encephalogram was symmetrical, with a normal alpha rhythm. The record was dominated by a generalised high-voltage rhythm of 20 cycles per sec. Twenty days after the operation distinct changes were observed. The alpha rhythm at 10–11 cycles per sec. was of greater amplitude and spread further forward. The fast rhythm of 20 cycles per sec. was no longer apparent but may have been masked. Irregular slow activity of 1–3 cycles per sec. was seen bilaterally in the prefrontal regions but was much more extensive on the right, where it was seen as a focus. A year after the operation the only abnormality was a small amount of low-voltage slow activity in the frontal regions, now greater on the left than on the right. 4 years after the operation (Nov. 6, 1952) the frontal slow activity was only just discernible, but the record showed a new abnormality: a bilateral theta rhythm at about 7–8 cycles per sec. predominantly in the left frontotemporal area. There were also, on overbreathing, suggestions of spikes in the left frontotemporal region.

Psychological Tests.—The patient was tested with the Wechsler-Bellevue scale before the operation and 1 4, 19, and 48 months after it. She scored an intelligence quotient of 110 before the operation, and her results showed no significant evidence of intellectual deterioration. A month after the operation there was clear evidence of intellectual impairment. Her scores on all subtests except picture completion, similarities, and block design showed not only no practice effect but even a definite loss. This was most evident on the picture arrangement, digit span, and digit symbol substitution subtests. 3 months later her performance had definitely improved, but 19 months after the operation it was still below her preoperative level. 4 years after the operation there was evidence that further deterioration had taken place. Her performance on all subtests was consistently below what it had been before the operation: she could not reproduce the Terman designs, her performance at Weigl's sorting test was poor, and she failed to learn the Babcock sentence after nine attempts.

Autonomic Functions.—On admission her blood-pressure was 250/130 mm. Hg. Her *urine* was normal, *blood-urea* 40 mg. per 100 ml., and *urea clearance* 102%. *Intravenous pyelography* revealed no functional or anatomical abnormality. Her *heart* showed some left ventricular enlargement. The blood-pressure was recorded morning and evening in the right arm. Though the evening values tended to be higher than the morning values, leucotomy affected both in a similar manner, and only the evening values are presented here (fig. 1). It will be seen that there was no pronounced fall in either the systolic or diastolic pressures even in the immediate postoperative period. A year after the operation (Nov. 30, 1949) the patient's blood-pressure was recorded in the out-patient department. It was then 220/125 mm. Hg. After 15 minutes' rest the mean of three readings was 192/112 mm. Hg. In November, 1952, the blood-pressure was 230/125 mm. Hg. These values were essentially the same as those found pre-operatively. In addition to the resting blood-pressure observations 'Sodium amytal' sedation tests were done both before and after operation. The results of these are given

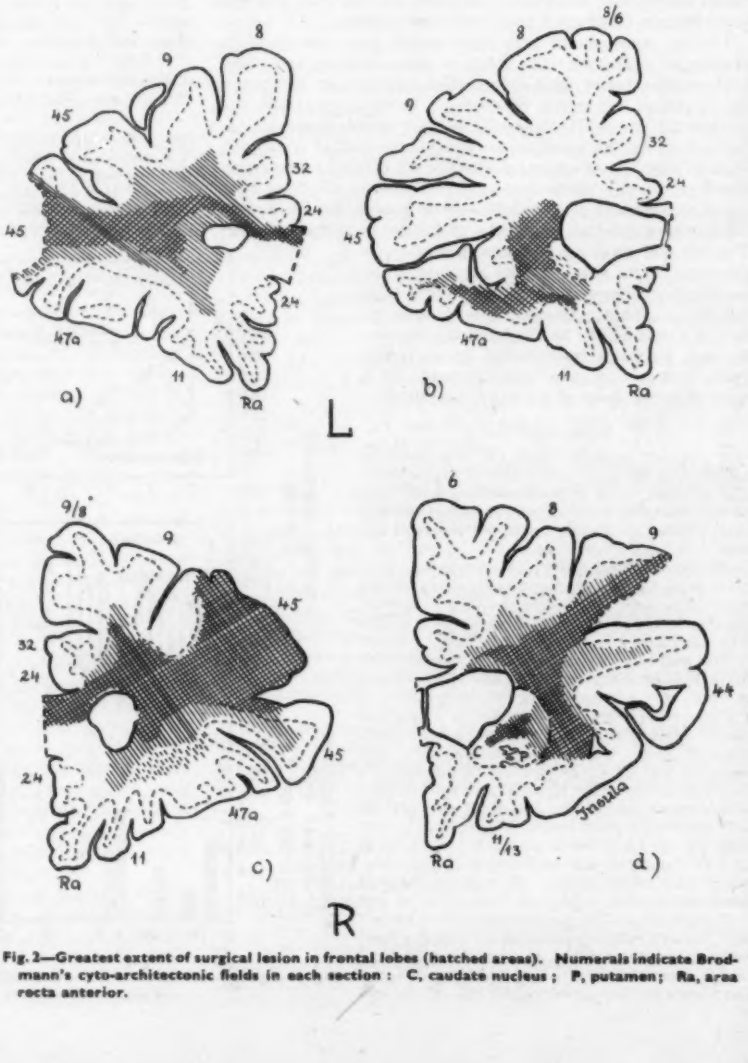

Fig. 2—Greatest extent of surgical lesion in frontal lobes (hatched areas). Numerals indicate Brodmann's cyto-architectonic fields in each section: C, caudate nucleus; P, putamen; Ra, area recta anterior.

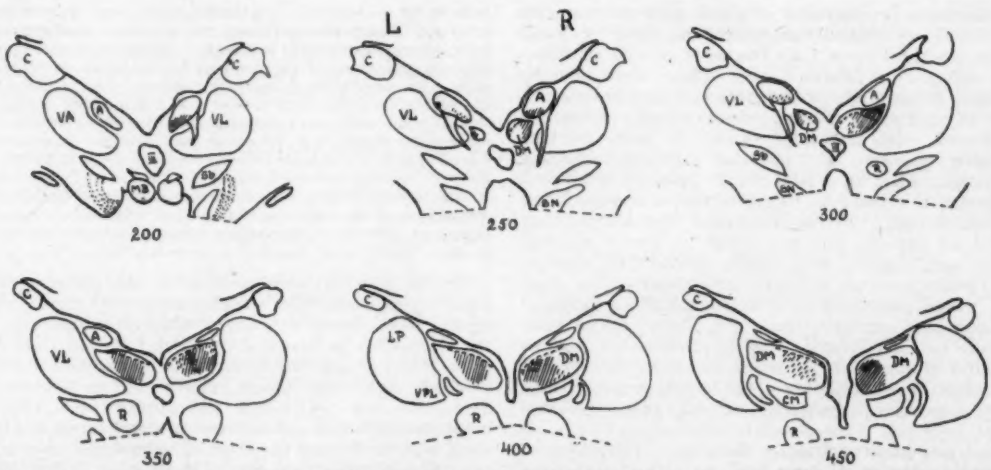

Fig.3—Retrograde degeneration in thalamus (hatched areas): A, nucleus anterior thalami; C, nucleus caudatus; DM, nucleus medialis dorsalis thalami; LP, nucleus lateralis posterior thalami; MB, corpus mammillare; R, nucleus ruber; Sb, corpus subthalamicum; SN, substantia nigra; VA, nucleus ventralis anterior thalami; VL, nucleus ventralis lateralis thalami; VPL, nucleus ventralis posterolateralis thalami; III ventriculus tertius.

graphically in fig. 1. In the second test, 29 days after the operation, the fall in both systolic and diastolic pressures was much less than preoperatively, the initial readings being much lower and the lowest reading very slightly higher. The *resistance of the palmar skin* was measured on several occasions before and after the operation. This technique has been described elsewhere, together with the results obtained with patients undergoing prefrontal leucotomy (Elithorn et al. 1954). Recordings were made from both hands. No consistent difference between the two hands was observed, and in fig. 1 the mean values for the two hands are given. It is apparent that all except one of the immediately postoperative values are higher than those found before the operation. The postoperative reduction in palmar sweating which generally follows prefrontal leucotomy has been shown to be independent of thermoregulatory requirements. It is probably related to the relief of anxiety which normally follows the operation. After the operation there was a considerable change in *weight*. In February, 1949, the patient weighed 9 st. $7^1/_2$ lb.; 2 years later she weighed 13 st. 5 lb. Strenuous attempts were made to keep her to a diet, and her weight fell to 11 st. 10 lb. On her last visit, in November, 1952, she weighed 11 st. $4^3/_4$ lb. Throughout the follow-up period she continued to complain of *insomnia*, which, however, was adequately controlled with hypnotics.

Pathology.—The brain weighed 1430 g. and showed considerable atheroma of all the arteries at the base, especially the vertebral, basilar, and carotid arteries. There was a slight bilateral tonsillar pressure cone. Both frontal lobes, particularly on their anterior and dorsal aspects, were somewhat atrophic. The leucotomy entry-marks were in the pars triangularis of the inferior frontal convolution on either side. A coronal section through these entry-marks at the level of the genu corporis callosi passed through the greatest extent of the leucotomy scar (fig. 2*a* and *c*). This occupied almost the entire white matter of both frontal lobes, extending to the wall of the lateral ventricle, which was pierced on the right side; the two scars communicated through the dorsal half of the corpus callosum. Only the most medial dorsal and orbital regions had escaped. The cortex of both inferior frontal convolutions was extensively damaged. More posteriorly, at the level of the head of the caudate nucleus, the lesion in the left hemisphere (fig. 2*b*) was much smaller and terminated in a central and ventral position, slightly involving the caudate nucleus. The lesion in the right hemisphere at this level (fig. 2*d*) was still extensive, and occupied, in addition to those structures mentioned above, parts of the striatum, the claustrum, and the capsulæ externa and extrema. It terminated 5 mm. further posteriorly in a similar position. Anteriorly the lesions extended within the central white matter to the level of the pregenual gyrus cinguli on either side. Histological investigation of serial sections through the thalamus (fig. 3) showed substantial retrograde degeneration in both dorsomedial nuclei (the right more than the left), moderate degeneration in the right anterior nucleus, and slight changes in the left anterior nucleus. There was considerable nerve-cell loss, shrinkage, and a dense compensatory gliosis. From the site of the degeneration within the thalamic nuclei and from the histological investigation of the surgical lesions one can conclude that the thalamic connections with Brodmann's areas 8, 9, 10, 46, 45, 47, lateral 11 and 24 were severed. All these areas were more severely involved on the right side than on the left. Further, a few fibres to the left medial orbital gyrus rectus were interrupted. In addition to the thalamofrontal projection, the fasciculus cinguli, the superior longitudinal and uncinate fasciculi, and Arnold's bundle were cut bilaterally. Representative blocks from various cortical regions showed no gross damage but some increase of the marginal glia and of the fibrous glia in the white matter. Most blood-vessels, both of the brain and the meninges, showed adventitial fibrosis; the larger and medium-sized arteries showed various degrees of arteriosclerosis.

Discussion

In view of the current preference for selective "bimedial" incisions this case is of considerable interest. It is clear that the operation aborted a severe hypochondriasis occurring at the involutional age. Pathological investigation has shown that this result was achieved in the absence of significant damage to, or involvement of, the medial orbital regions, and with only unilateral involvement of the cingulate areas. In the light of these findings it seems worth while to examine the evidence on which the current preference for bimedial operations is based. In doing so it becomes necessary to consider whether an operation which produces statistically "maximal improvement with minimal personality change" is necessarily the operation of choice in any given patient.

Much of the enthusiasm for the bimedial operation stems from the results of the Massachusetts lobotomy studies (Greenblatt and Solomon 1952). These workers have, in fact, only shown that in *schizophrenics* this operation produces results which are more satisfactory than either a standard bilateral operation or a unilateral one. They do not themselves provide any evidence on which the different symmetrical modified cuts can be compared. Their original preference for this operation is perhaps based on the earlier work of Scoville et al. (1951), who reported the results obtained in an investigation which compared the effects of three selective undercuts: superior, medial cingulate, and orbital.

These workers, the majority of whose patients were also *schizophrenic*, concluded that there was little to choose between the three areas from the point of view of therapeutic effect, but claimed that there were definite differences between the postoperative syndromes characteristic of each area. The superior-convexity operation, they stated, was associated with the most striking personality changes, in particular emotional blunting and apathy. After an orbital cut the personality showed less change, this being in the direction of hyperactivity and restlessness. Medial cingulate operations they reported as causing postoperatively a severe physical "knock out," again with little personality change. These results contrast strongly with those of Le Beau (1952), whose patients also underwent various forms of topectomy and undercutting. Le Beau agrees that operations on the convexity tend to produce the greatest personality change; in his cases, however, this was in the direction of overactivity—"the hypomanic syndrome of the convexity"—whereas orbital cuts produced apathy.

Similar inconclusive findings have also been reported after clinicopathological investigations. Thus, reviewing the results obtained from their study at the Institute of Psychiatry, Meyer and Beck (1954) conclude:

"The dorsal and, in particular, the dorso-lateral sectors of white matter do not appear to be as significant for improvement as the midcentral, orbital and cingulate sectors. On the other hand, involvement of the dorso-lateral and lateral white matter, and particularly cortex, appears to be one of the factors responsible for severe personality change." However, they point out that "full social recovery was obtained provided the cut was quantitatively adequate without consistent involvement of medial, orbital, and cingular segments."

Eie (1954) reports the macroscopic necropsy findings in 29 cases and claims that his results show that

"aggressive, hyperactive, restless patients may improve after lesions limited to the connections of the granular areas of the convexity and of the cingulate gyrus."

One important difference between various workers is that the selection of patients differs widely from one investigation to another. Both pathological investigations were undertaken largely on patients who died in mental hospitals. The Maudsley material was diagnostically mixed, whereas those of Eie's patients who were suitable for clinicopathological analysis were all overactive and aggressive before operation. In the two clinical series discussed the contrast is even greater: most of Scoville's patients were *schizophrenics*, whereas most of Le Beau's were operated on for *intractable pain*.

The striking contradictions between the results found by these and other workers suggest that ablations of anatomically corresponding areas need not produce similar defects in different patients. Indeed, most clinicians will agree that their expectations of the sort of defects which may follow any individual leucotomy are coloured by the previous personality of the patient.

The conception that there exists an operation which will produce the greatest improvement together with the smallest personality change is based on the belief that improvement and personality change are two independent variables. On theoretical grounds, and these are supported by clinical observations—in particular Partridge's (1949) important observations on depressive illnesses treated by leucotomy—it may be presumed that two major effects may be expected from frontal ablations:

(1) Such a lesion may abort a functional psychosis (e.g., an endogenous depressive illness) which in other circumstances might be expected to resolve spontaneously or to be resolved by treatment (e.g., electric shock). For this effect the surgeon would seek to damage the area which would produce the greatest "shock" effect together with the smallest persisting disturbance of personality and intellect.

(2) The second main effect of a prefrontal ablation is to produce a change of personality which is generally characterised by a reduction in anticipatory and preoccupative activity. Such a change, if not too extensive, may sometimes be in all ways beneficial, and is then sought deliberately in the surgical treatment of psychoneurotic disturbances of personality. In other cases it might be necessary to produce these changes to an excessive degree so that a diminished personality should react with less emotional disturbance to an otherwise intolerable strain—e.g., excessive pain, and the experiences of a schizophrenic psychosis (Frankl and Mayer-Gross 1947). The surgeon seeking to obtain solely an alteration in personality structure would wish to cause the least structural damage compatible with achieving the desired effect—i.e., he would choose to operate on the region known to be most likely to produce the type of personality alteration which was desired.

Applying this type of analysis to the present clinicopathological case-report one may argue that the successful results were closely associated with, and dependent on, the alterations in personality which followed the operation. There was in the history and on examination little evidence that the illness might be an endogenous depressive one. Although the onset was during the involutional period and followed a minor physical illness, there was no diurnal variation of symptoms, no retardation, and no objective sign of depression. The clinical picture was essentially one of preoccupation with, and elaboration of, a disturbance of sensation. It can be explained most economically as a reactive development of the patient's premorbid personality tendency to anxious preoccupation of the obsessional type. This excessive reaction may perhaps have been partly precipitated by arteriolar and psychological stresses associated with the involutional period. The changes in personality which followed leucotomy, and which justifiably came to be characterised as defects—i.e., her laziness, her placidity and her lack of concern for herself, her property, and her relations—can be seen as a reduction in her tendency to ruminative and anxious preoccupation. Two main qualitative differences between her bothering less about her symptoms and her bothering less about her cooking and her finances seem to be (1) that the stimulus of the tinnitus was always present, and (2) that taking thought about the noises would not reduce their intensity. Failure to habituate to a constant and irreducible source of emotional distress is characteristic of the neurotic personality and especially of the obsessional neurotic. It is therefore likely that the change of personality involving a reduction in preoccupative anxiety was essential to the success of this operation, and that this personality change was undesirable only in so far as it was excessive.

As regards the involvement of the orbital and cingulate regions, it appears that, since the operation was both successful and excessive, a further extension of the lesion would only have increased the defects. To have cut the orbital and cingulate sections in place of an equal amount of dorsal tissue would (according to most workers) have produced less personality change. But (most authorities would again agree) a similar effect would have been produced more economically by reducing the amount of dorsal tissue cut. Later experience with modified leucotomies in non-psychotic patients crippled by a morbid preoccupation with a tinnitus has in fact shown that operations restricted to the convexity, as well as bimedial cuts can produce relief with only minor personality changes. These changes may in their own right be regarded by close relations as beneficial (Elithorn 1953).

We may conclude that the search for an operation which is statistically most satisfactory for all patients is sterile. Both the relevant published reports and the analysis of the present clinicopathological report support Fulton's (1951) contention that restricted leucotomies should be adapted "to the nature of the mental illness." Fulton suggests that depressed patients should have the bimedial type of operation, and that those who are overactive or agitated might benefit most from a dorsal

topectomy. It only necessary to point out that a causal clinical ... more important and relevant than an observational correlation which will depend on the sample of patients examined. Many patients are agitated and overactive because they have a "depressive" illness.

Summary

The clinical history of a patient incapacitated by preoccupation with severe tinnitus and who was treated successfully by a "standard" prefrontal leucotomy is reported, together with a description of the primary lesions and the retrograde degeneration in the thalamic nuclei.

The concept that there is a single selective operation which will provide in each case the greatest improvement with the smallest personality change is dismissed as unlikely.

The relative rôles of "improvement" and "personality change" in producing a satisfactory therapeutic result are discussed.

We are particularly indebted to Dr. Eliot Slater and Mr. Harvey Jackson, under whose care this patient was, and we would also like to thank Dr. E. A. Carmichael and Prof. A. Meyer for encouragement and advice. Miss M. A. Crosskey assisted with the autonomic investigations. We are also indebted to Dr. W. A. Cobb and Prof. O. L. Zangwill, in whose departments the electro-encephalographic and psychological studies were made.

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Preliminary Communication

BLOOD CONCENTRATIONS OF PYRUVIC AND α-KETOGLUTARIC ACIDS IN NORMAL PEOPLE AND DIABETIC PATIENTS

THE blood-levels of α-keto acids in patients with diabetes mellitus have attracted interest in recent years with the development of more specific and accurate methods for determining these important metabolites. Villano [1] claimed that the blood concentrations of pyruvic and α-ketoglutaric acids were greatly increased in diabetes, but other workers [2 3] have reported raised blood-levels of the two acids in only about half their patients, and Von Marken and Florijn [4] stated that the blood-pyruvate level was normal in diabetic coma. Conflicting results have also been obtained with animals: Fidanza and Laviano [5] reported increased blood-α-ketoglutarate levels in alloxan-diabetic rats, whereas Frohman et al.[6] observed that the tissues of alloxan-diabetic rats possessed a normal content of pyruvic acid but decreased levels of α-ketoglutaric acid.

The methods used have usually been based on the formation and subsequent separation by paper-chromatography of the 2 : 4 dinitrophenylhydrazone derivatives of the α-keto acids. However, 2 : 4 dinitrophenylhydrazine is not a completely satisfactory reagent for this purpose because it is not specific for the α-keto acid grouping, and also because the derivatives tend to give rise to multiple spots during paper-chromatography, from separation of geometrical isomerides.[7] The first objection is of particular relevance when specimens from diabetic patients with ketosis are examined, because interference from aceto-acetic acid may occur when high concentrations of this substance are present.[8]

BLOOD CONCENTRATIONS OF PYRUVATE, α-KETOGLUTARATE, AND GLUCOSE IN NORMAL AND DIABETIC SUBJECTS (MG. PER 100 ML.)

—		Pyruvate	α-keto-glutarate	Glucose
Diabetic patients (8)	1	0·35	0·14	200
	2	0·33	0·06	94
	3	0·50	0·10	208
	4	0·31	0·05	250
	5	0·43	0·10	224
	6	0·26	0·08	350
	7	0·44	0·07	290
	8	0·86	0·14	72
Mean ± standard error		0·44 ± 0·19	0·09 ± 0·03	211 ± 93
Normal subjects (7)	Mean ± standard error	0·35 ± 0·07	0·10 ± 0·02	96 ± 16
	Range	0·27 − 0·47	0·08 − 0·13	67 − 113

We have devised a method for the separation and estimation of pyruvic and α-ketoglutaric acids in blood using 1 : 2-diamino-4-nitrobenzene, which was introduced by Hockenhull and Floodgate [9] as a specific reagent for α-keto acids, with which it forms stable derivatives separable by paper-chromatography. The reagent is allowed to react with the deproteinised blood-filtrate for 12–16 hours, and the derivatives are extracted with ethyl acetate and removed from the organic solvent with 5% *w/v* sodium carbonate solution. After acidification of the sodium carbonate solution, the derivatives are re-extracted with ethyl acetate, which is then evaporated to dryness; the residue is dissolved in acetone and the derivatives are separated by paper-chromatography.[10] The separated derivatives are eluted with 30% ethanol, and the optical densities of the resulting solutions measured at 280 mμ.

The blood pyruvate, α-ketoglutarate, and glucose concentrations in 7 normal people and 8 ambulant diabetic outpatients are given in the table. All the patients were receiving insulin, and were healthy apart from their diabetes; 2 had a moderate degree of ketosis, Rothera's test of their urine being moderately strongly positive at the time the blood samples were taken. Inpatients or patients with intercurrent illness were excluded from the diabetic group to make it as comparable as possible with the group of normal people.

The results show that there was no significant difference between the two groups in the blood-levels of α-keto acids. In the diabetic patients there was no correlation between the blood concentrations of glucose and of the two α-keto acids.

It appears, therefore, that in this series of patients the diabetes was not associated with any disturbance of the blood-levels of pyruvic or α-ketoglutaric acids over a wide range of blood-glucose concentrations. We propose to extend our studies to include analysis of the urine, and also to investigate the blood concentrations and urinary excretion of pyruvic and α-ketoglutaric acids in hospital patients with more severe diabetes.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

A Children's Psychiatric Unit in a Mental Hospital

At a meeting of the section of psychiatry on Dec. 14 with Dr. W. MAYER-GROSS, the president, in the chair, Dr. J. B. ROGERS described an inpatient children's psychiatric unit which has been in action at the Crichton Royal Hospital for $3^1/_2$ years.

The unit (which is not the first of its kind) is, he said, contained in three houses outside the hospital grounds, each capable of taking twenty children. At Ladyfield, the first house to be acquired, there are twelve boys and eight girls aged 5–14, all of normal or better intelligence. Organic disorders, behaviour difficulties, psychoses, and maladjustment are represented among them. They normally do ordinary school work throughout their stay, under the care of one full-time and one part-time teacher. Some, however, when they first come, do no school work for a few days, or only 2 hours daily for a time, depending on their mental and emotional state. At times a special course (called something like "domestic science") is devised for a much disturbed child, which means in effect that he has a nurse to himself for a few days. The school week is varied by swimming on two afternoons in the hospital swimming-pool (and the children never enter the main hospital grounds at other times), a Wednesday visit to town to spend pocket-money, church on Sunday, and a picnic trip to country or seaside on Saturday. All activities are voluntary, but Dr. Rogers finds that the children are more secure if they have a regular routine: even the rebellious like a framework to rebel against. True discipline is based on the bargain the child makes with life: "I will give up this gratification to retain your approval." To help him towards making this bargain the nurses must be secure in themselves; and they must be able to give affection steadily all the time. They also need to know what stage the child has reached; and in the weekly discussions with the psychotherapist all the nurses attend and are encouraged to talk about what they have noticed. The educational psychologist, the teachers, the occupational therapist, and the psychiatric social worker also attend. Those who spend most time with the children are junior nurses, or cadets, and they often make valuable contributions. Ladyfield is staffed by three senior nurses (one a man), three assistant nurses, and five cadets; and all the domestic work is done by the nurses. Ward-maids are apt to become the recipients of confidences and to form relationships with the children which are outside the therapeutic scheme, so it is necessary to do without them. Dr. Rogers gave examples of three groups of children and their treatment—those with educational difficulties, those who had been unable to cope with stresses in their surroundings, and psychotic children.

One child, aged 9, had been at school for 4 years and was unable to read or write. Tests showed him to be above average in intelligence but suffering from word-blindness. This had caused emotional disturbance with panic reactions. After two terms of special teaching and individual help he was able to go to a special school, and later to an ordinary school. Another boy of good intelligence, who had become stone deaf after treatment for tuberculous meningitis at the age of 7, expressed his frustration in severe temper tantrums. He settled well, and was able in time to go to a deaf school.

A girl of 8, the middle daughter of three, was rejected by both her parents and responded to stress by enuresis and encopresis. She wandered about apart from the other children, but accepted the chance of daily interviews with Dr. Rogers, and finally spoke out her fear that she would never have a happy life because nobody wanted her. The sister in charge of the unit then began to give her special attention and established a warm relationship. Thus encouraged, the child began to make a little trouble in the dormitory, banding first with two younger girls to tease an older one, and later with the older girl to tease one of the youngsters. Each of the teased children had to be fortified by the affectionate attention of a nurse of her own. The patient next made trouble in the occupational-therapy class, and this too simmered down in time. Such "testing out" behaviour on the part of an insecure child is common, and this child was also enjoying the experience of having her two sisters—vicariously—under her thumb. She improved steadily all round.

Psychotic children present a very difficult problem, but Dr. Rogers finds that individual therapy can produce, if not recovery, at least a remission.

One psychotic boy of 7 wandered alone and used infantile speech; yet he could tell the time at a glance and knew his tables up to 24-times. He was given individual therapy by a woman doctor with whom he would spend at first only 10 minutes at a time. Later he would stay for $^3/_4$ hour, and took to climbing on her knee and showing infantile curiosity in her breasts. A visit from his parents caused him to withdraw again, and they were advised (contrary to all usual custom) not to visit for 3 months. At the end of that time he had improved and made relations with other children. He went home for 6 weeks' holiday and got on well, though his mother was not fully able to tolerate his infantile sexual curiosity. On his return he played better with other children, and a second holiday at home was more successful. He now appears to be almost a normal boy. During his treatment the nurses had to be reminded not to leave him alone to play by himself: it was only individual attention that kept him in touch with his surroundings.

The psychiatric social worker sees the parents when they visit—usually on Saturday and Sunday—and the parents and home are brought into the therapeutic scheme from the beginning. Some of the children come from institutions, and the unit makes the same approach to those responsible for them as it does to the parents.

At Ladyfield West, the second house, the children are quieter than those at Ladyfield: no hyperactive children are taken, and the atmosphere is more tranquil. The third house, Hannahfield Hall, receives children with both mental and physical handicaps—for instance, a mentally defective and blind spastic girl, and a boy withdrawn in catatonia. The psychotic boy already mentioned is in Hannahfield Hall, but now he only sleeps there, spending all his days at Ladyfield.

The objects of the unit are to provide an environment in which the child gets the benefits of a good home influence (the mother and father figures being provided by the nursing staff), regular schooling, and hospital treatment. In the interests of research each child has an ordinary case-history folder, and also a separate research folder in which all that is known about him is summarised weekly. Behaviour is also recorded on a chart, and these charts are already throwing light on the natural history of psychiatric disorders in children. It is a common experience that the beginning of improvement does not necessarily mean improved behaviour.

In a child of 11, encopresis was replaced, after 4 weeks' treatment, by violent aggression. The mother, not too pleased, said she had preferred him as he was. It turned out that her husband (whom she had always described as "ineffectual") had at times been imprisoned for assaulting her.

Dr. Rogers hopes to follow up as many of his cases as possible for 20 years. He is also trying to see all the maladjusted children in a rural area, and hopes to compare their development with that of normal children in the same area.

In deciding whether or not it is important that such a unit should be part of a mental hospital he gives great weight to the part played by the nurses. They must be secure maternal people, able to give love and devotion but in no sense "deprived parents." Teachers have a different function, and so have occupational therapists: their part in the therapeutic scheme is primarily to teach. The approach of a teacher is

necessarily didactic to some extent, that of a nurse maternal. Nurses from the hospital can be tried out in the unit, and given plenty of attention while they are new to the unit. Those who are interested and have a flair for the work want to stay. He emphasised, too, the value of cadets. These young girls, aged 16 and 17, are hand-picked from local families, and because they are young enough to enjoy playing games with the children they are a great asset, and do a first-class job. He also believes that child psychiatry should not be divorced from adult psychiatry: they are parts of a whole picture.

DISCUSSION

Dr. D. E. SANDS described the male and female juvenile departments in the grounds of St. Ebba's Hospital. These take boys and girls aged 12–17. He finds that sometimes a few young women from the adult wards can be suitably transferred to the female juvenile ward, to the advantage of the girls. Conversely, boys of 16–17 sometimes do better in an adult ward. The neurotics and psychotics among these young people mix well, but they are intolerant of the psychopaths among them. The more disruptive psychopathic girls, he finds, often settle better in a ward of young adults suffering from chronic psychoses; here their antisocial activities receive neither stimulation nor response from their fellow patients; in fact they get a chance to shine by contrast, and become quite helpful. The difficulty is to know where to send them after treatment; they usually have to go into care elsewhere, whereas most of the neurotic and psychotic patients are able to return home. A special hospital for adult psychopaths has been projected, but it would be incomplete without a similar one elsewhere for juveniles. The phases in development in mental illness in the young are not clear cut, but a not uncommon sequence in boys is from an anxiety-provoking situation to a behaviour disorder, then via an obsessional stage to schizophrenia; and in girls anxiety is more often converted to hysterical neurosis, and then to schizophrenia. The transition from one phase to another can happen within a week. This suggests, he said, that there can be no real separation of neurosis from psychosis, and that these terms merely indicate stages in the development of mental illness. Finally he regarded the establishment of units for children or for juveniles as within the normal scope of a mental hospital, and a further stage in the fulfilment of the needs of the community by these hospitals.

Dr. KENNETH CAMERON spoke of the variety of demands made on a unit such as that at the Crichton Royal. It must provide an observation and diagnostic service, intensive group and individual treatment, and care for long-term cases. The first service is often hampered by the fact that once the diagnosis is made it is necessary to provide treatment, and places are scarce. If the child needs to be transferred to a suitable educational centre, it is not always within the power of the unit to arrange the transfer. He agreed heartily with Dr. Rogers about the importance and value of the nursing care; well-trained psychiatric nurses, he said, adapt themselves well to the needs of child patients.

In the ensuing discussion it was urged that schools for the maladjusted should not be used as an alternative to treatment in a unit such as that described. The presence of psychotic and psychopathic children in such schools can greatly hinder the treatment of the children who should properly be there. Dr. ROGERS agreed that maladjusted schools ought not to be used in this way. He does not, however, care to apply the term "psychopath" to any child. It is generally "used of children who have been kicked around for years" and are unable to form a relationship with anybody. Given individual treatment they do at last respond and form relations with other people—at least he has not yet met one who failed to do so. But it takes at least 5 years, and perhaps there are exceptions: he will know better in 20 years' time. It was also suggested that this kind of unit might well be attached to a children's hospital, to which the psychiatrist might come. Good pædiatric nurses, speakers pointed out, can also adapt themselves to children with psychiatric problems. Dr. Rogers agreed on the importance of a close link between pædiatricians and psychiatrists doing this work, but reminded the meeting that the equipment of a mental hospital is of service: an electro-encephalograph, for instance, is there on the spot.

Interrogated about adolescent problems, destructive behaviour, dancing, pets, and music, he replied that as the children were young he had no adolescent problems. He had no destructive behaviour either—or very little. A greenhouse adjacent to the unit, used mainly to grow flowers for the delectation of the board of management, had lost only 7 panes in $3^1/_2$ years, and the children were much more destructive to the staff (in the sense of having rows with them) than to the place. A row, he thinks, is more satisfactory, as therapy for aggression, than the breaking up of coal, or indeed of anything else; for if the therapist goes on behaving like a reasonable person, and liking the angry child, the child gains security and the rows gradually stop. Before the staff learned this the children took out the fireplaces and so on; but now that the staff know how to cope there is little destruction of property. He encourages as many pets as the nurses will tolerate, but he finds cats get on best; they have nine lives and need every one of them. Country dancing, singing-games, and a percussion band provide the music, as well as a local dance-band leader with a piano-accordion.

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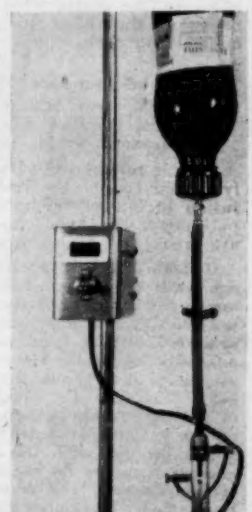

In a ward at night this apparatus will enable a nurse to be sure that a drip is behaving properly; and she will therefore have no need to use a torch, which might awaken a sleeping patient. In the theatre the placing of the neon light on the anæsthetist's table remote from the drip will enable him to keep a check even when the table is surrounded by onlookers.

St. Bartholomew's Hospital, London

FRANKIS EVANS
M.B. Lond., F.F.A.R.C.S.

Reviews of Books

The Spino-cerebellar Degenerations

J. G. GREENFIELD, M.D., F.R.C.P., honorary consulting pathologist, National Hospital for Diseases of the Nervous System, London. Oxford: Blackwell Scientific Publications. 1954. Pp. 112. 17*s.* 6*d.*

CLINICAL neurologists have for many years moved ataxically through the eponymous wasteland of the spino-cerebellar disorders. But Dr. Greenfield's unrivalled experience of the clinical and pathological features of these diseases, added to his extensive knowledge of the literature, has given us an informative and authoritative monograph. The wise man is rarely dogmatic where information is vague and uncertain, and he recognises that no differential diagnosis is possible during life between many of the different forms of cerebellar and spino-cerebellar disease.

The scaffolding to the study is built from the historical and the pathological backgrounds to the spino-cerebellar disorders. A short (perhaps too short) account of the anatomical and physiological considerations leads to a comprehensive classification of the degenerations, which are ranged into three main groups—predominantly spinal, spino-cerebellar, and predominantly cerebellar. This classification is clear and concise, and takes into account the eponyms with which the subject is burdened. Instead of adhering closely to his original outline Dr. Greenfield selects only a few of the types for historical and pathological discussion, and he does so in such a way that at first order appears to dissolve once more into disorder. But as soon as the reader realises that this elaborative section is intended as a commentary rather than a fully organised and comprehensive statement, he can settle down to a clear and detailed exposition of the historical, clinical, and pathological features of the many forms of these degenerations, with which so many neurologists and neuropathologists have perpetuated their own names, often at the cost of confusing the minds of their successors. In this survey Friedrich receives due homage, Menzel, Holmes, Déjerine, André Thomas, and others are appreciated, but Marie is consigned to whatever eternity is reserved for the uncritical. The monograph ends with some comments on blindness and dementia in association with the hereditary ataxias, and there is a full bibliography.

Neurologists, neurosurgeons, and neuropathologists alike, will be grateful to Dr. Greenfield for removing so many of the misapprehensions caused by unselective clinical and pathological work in the past.

Tumours of Lymphoid Tissue

GEORGE LUMB, M.D., reader in pathology, Westminster Medical School. Edinburgh and London: E. & S. Livingstone. 1954. Pp. 204. 37*s.* 6*d.*

IN this monograph, based on 410 cases of tumour of lymphoid tissue, Dr. Lumb succeeds in dispelling confusion in one of the more difficult chapters in human pathology. His style is lucid, the well-chosen photographs are excellent, and the statistical tables are useful.

Hodgkin's disease accounts for 46·1% of the series, as against 19·2% for lymphosarcoma and 16·9% for anaplastic sarcoma. The five-year survival-rate for Hodgkin's disease is 34·96% (the average survival is four and a half years) as against 62·3% for follicular lymphoma and only 5·26% for anaplastic sarcoma. The five-year survival-rate for lymphosarcoma is 22·22% over the age of thirty-five but only 12·5% below that age. Dr. Lumb objects to the common misuse of the term "reticulosis"; to him it connotes a reaction on the part of pluripotential mesenchymal cells to varying stimuli, and as such the term is analogous to fibrosis and gliosis; therefore its use in a particular sense to denote a specific disease ("one of the reticuloses"!) cannot, he says, be justified. Certainly nomenclature and oncological classification can be simplified if one accepts his contention that the variation in structure of the tumours and degree of malignancy is due to the cell-type differentiation from pluripotential cells.

The book will be invaluable to the many who are concerned in the giving of prognosis. As in other tumours, anaplasia is a sign of malignancy, but there are occasional surprises as when the prognosis proves to be better than the histological appearance had suggested. There are good sections on biopsy technique, including the recognition of artefacts, the effects of radiation, and problems in differential diagnosis. There is also a bibliography and an interesting historical survey.

Leukæmia Research

A Ciba Foundation Symposium. Editors: G. E. W. WOLSTENHOLME, O.B.E., M.A., M.B., MARGARET P. CAMERON, M.A., A.B.L.S., assisted by JOAN ETHERINGTON. London: J. & A. Churchill. 1954. Pp. 297. 30*s.*

THE selection of leukæmia research for this symposium is due to the European scientific advisory committee of the Lady Tata Trust, and many of the workers invited have been supported by the trust at some time. The result is a comprehensive account of current research in which all points of view are represented.

Here will be found accounts of the multiplying chemotherapy, and what still remains for radiotherapy; there is a notable discussion on the virus transmission of mouse leukæmia, and at several points the question of how far these animal studies are applicable to the human disease is discussed. Fowl-leukæmia studies are now less important and there is little on cell morphology. Furth presented his concept of conditioned and autonomous neoplasms, an idea that may well be fruitful in leukæmia. The account of the effect of ionising radiations has a topical interest.

This volume forms a most useful starting-point for anyone contemplating research in this field, and is a valuable summary of growing-points for those actively working in hæmatology.

The Billroth I Gastric Resection

With particular reference to the surgery of peptic ulcer. HORACE G. MOORE, jun., M.D., formerly instructor in surgery, University of Washington School of Medicine; HENRY N. HARKINS, M.D., PH.D., F.A.C.S., professor of surgery, University of Washington School of Medicine. Boston: Little, Brown & Co. London: H. K. Lewis. 1954. Pp. 176. 52*s.* 6*d.*

THIS short and beautifully produced book is a plea for the Billroth-I gastrectomy, particularly in the treatment of duodenal ulcer. Chapters 5 and 8 contain the main meat in the volume. The former gives the technical details for performing the operation, and the excellent drawings of the Von Haberer-Finney end-to-side anastomosis of the stomach to the duodenum are convincing evidence that the scars of duodenal ulceration are no bar to a safe gastroduodenal junction. Chapter 8 weighs the evidence for and against the operation and reaches a favourable verdict. There is much else to interest gastric surgeons, including some historical notes on gastrectomy in general; and a review of the literature on the dumping syndrome, in which British work receives full attention. Gastric surgeons, whether they can or cannot afford to be without this book, should certainly read it.

Scientific Books, Libraries, and Collectors (London: The Library Association. 1954. Pp. 288. 24*s.*).—Mr. J. L. Thornton, the librarian of St. Bartholomew's Hospital Medical College, has followed his learned history of *Medical Books*, published in 1949, with an even more ambitous volume, compiled with Mr. R. I. J. Tully of Bangor, on the history of scientific literature. They bring into readable compass information which is not easily accessible, and offer a readable history of science from a new angle. Instead of recording the great discoveries and advances in scientific knowledge, they plot the course taken by each scientist in making his work known. In this way they guide the inquirer to the original sources for our knowledge of scientific discoveries. The book covers all sciences, other than those strictly medical, from the ancient world to the end of the 19th century. There are informative chapters on the growth of scientific periodical literature and of scientific societies. The mathematical sciences are less fully covered than the biological, and any doctor would enjoy a great part of the book. He might begin, for example, with pages 150 to 160 where the writings of the great 19th century biologists, both field naturalists and laboratory men, are admirably surveyed and implicitly related to the work of Charles Darwin.

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THE LANCET
LONDON: SATURDAY, JAN. 1, 1955

With which we Serve

A large nation cannot live on a small island, and enjoy modern amenities, unless its people are willing to accept much more regulation of their lives and work than our forefathers would have tolerated. What we in Britain are trying to achieve is a proper balance between the claims of the community and the claims of the individual; and we hope to prove ourselves politically capable of creating order without imposing uniformity—of reaching the next millennium without passing through *1984*. Seen in this larger context, the National Health Service is an attempt to devise a system in which medical work can be publicly financed and comprehensively planned, but in which the essential liberties of patient and doctor are preserved. After six and a half years' experience an unprejudiced observer would probably say that, for all its defects, this vast and complex organisation has worked on the whole surprisingly well; and the Ministry of Health's recent review of five years' progress [1] is in many ways encouraging. But initial progress does not necessarily imply ultimate success, and our ingenious compromise may yet justify the pessimists—either because, in the long run, it does not promote efficiency, or because it does not maintain freedom, or even because it does neither.

How the experiment turns out will depend largely on what doctors think and do about it; and, as a matter of fact, different people have quite different ideas about the fundamental nature of the N.H.S., according to which of its purposes they regard as primary. With its powers of regulation and planning uppermost in their mind, many doctors, and also many laymen, see it simply as an instrument of government: having assumed responsibility for all medical care, the State discharges this responsibility through a chain of command reaching from the Minister in Whitehall to the practitioner in his surgery. On this view every hospital is a branch establishment of the Ministry and every doctor is a medical officer whose principal duty is to perform the tasks allotted to him, keeping most carefully to the rules. This is of course the simple readily comprehensible pattern of a State medical service, which so often strikes the layman as just what is needed; and it is the pattern which we may eventually get if we make the mistake of supposing that it is here already. In point of fact, elaborate precautions were taken to prevent the N.H.S. from being a crudely authoritarian service of this kind; but if doctors themselves neither notice nor care about the difference how should the laity know better? Every time that one of us—either out of irritation or in earnest—talks of a "State doctor" or a "State patient," he brings nearer the day when doctors and patients may be just that. On the other hand, this day need never come if the profession fixes its mind, and sets its heart, on securing what was originally intended:

> "Though the Minister of Health took wide powers which he could hold in reserve, the Government's avowed object was to integrate, support, and supplement the work of existing medical agencies rather than to unify, regulate, or supersede them. The N.H.S. should in fact be regarded not as a centralised service, in which the hospitals and doctors at the periphery exist to carry out central instructions, but rather as a confederation of medical institutions whose activities need coördination and sometimes leadership. It is these institutions, varying in size from the single-handed practice to the large hospital, that actually look after patients; and, whether as individuals or groups, they develop their own methods and standards." [2]

In this concept of a confederation of institutions, with its emphasis on variety and initiative, we have the antithesis of, and the alternative to, the kind of State medical service which emphasises uniformity and control.

In the closing months of his life Sir JAMES SPENCE gave much thought to the contrast between services and institutions as means of providing medical care. Unfortunately, the fragment of his last lecture which we publish this week does not contain his definition of an organised service; but he might have agreed that such a service is an undertaking in which the requirements of an authority are fulfilled by the servants of that authority. Since Parliament has decreed that medical care shall be provided, and has made a Minister responsible for seeing that this is done, it has been necessary to establish an administrative service in which the Minister's servants are under a duty to carry out his instructions. To this extent the N.H.S. is in fact a centralised service under the State. But it ceases to be a service at the point where administration ceases and medical work begins; for clinicians are in no sense servants of the Minister but only of their patients. In the end what really matters is not the service—the enabling device—but the actual institutions, large and small, through which patients are helped; and SPENCE was deeply anxious first that these medical institutions should be good, and secondly that every doctor should think of himself always as a member of the institution where he works and never as a member of some remote service. An institution he defined as the establishment and arrangement of human effort towards a common end, carried out "by the covenant of one with another"—which is something different from carrying out orders. The institution may be a general practice, or a cricket club, or a hospital, or even something so large as a university; but there is always a risk in excessive size, because in a large institution the sense of mutual covenant, or of belonging to a group working to a

1. Report of the Ministry of Health for 1953. H.M. Stationery Office. 1954. See *Lancet*, 1954, ii, 1169.

2. Memorandum of Evidence submitted by the Royal College of Physicians to the Guillebaud Committee. See *Lancet*, 1954, i, 562.

common end, is all too apt to weaken or disappear. In SPENCE's opinion the big hospital, with doctors who do not know each other, is liable to lose its status as an institution and become only a sort of service, whose personnel are merely performing duties instead of being concerned together in their chosen task.

Does this philosophising lead anywhere? Yes, if we recognise that, from the patient's standpoint, all that matters in the N.H.S. is the excellence of its constituent institutions, and if we all—doctors and administrators alike—pay less attention to the service in the abstract and more to the means by which these institutions can be strengthened. Is it not probable, for example, that the morale of some of our hospitals has been unnecessarily weakened by brigading them with others in a way that has removed their sense of identity? In these days when we are preoccupied with establishing specialist "services"—orthopædic, obstetric, and so on—are the members of hospital staffs really given enough say in choosing their new colleagues?[3] (Like marriages arranged by parents, appointments by outsiders are sometimes very successful, but they are by no means always the happiest start for thirty years' coöperation; and perhaps, as SPENCE believed, the post-war discouragement of institutional inbreeding has been carried to a point where it does more harm than good.) Finally, should not administrators give further thought to his remark that he knew of no example of a good hospital which has not been created through the good offices and good will of its medical staff? The corollary to this is that damage is done when the medical staff either cannot or do not give guidance to the governing body. Though the administrative decisions have to be made by the boards and committees which are part of the Minister's executive service, the doctor's responsibility and interest should be by no means confined to the care of his patient, but should extend throughout the institution of which he is a member.

To organise the medical care of fifty million people on a high level, and at the same time ensure that professionally every doctor remains his own master, is an extraordinarily hard task; and we are all well aware that it may be made virtually impossible by such unfavourable factors as too little money, too much machinery, or even the rulings of judges who find no legal sanction for the doctrine of professional responsibility—regarding the surgeon, like the boiler-man, as a servant of his board. Even so, perhaps the most serious menace to the National Health Service comes from those doctors in it who feel that they have been conscripted into a service and therefore dissociate themselves from the effort to make it succeed. In a small but important minority of cases this dissociation takes the active form of exploiting, or allowing their patients to exploit, an organisation towards which they feel no loyalty; but usually it manifests itself in nothing worse than a tendency to attribute all faults to "them" not to "us." When one recalls the original and deeply sincere opposition to the whole scheme, this latter degree of dissociation is indeed very far from surprising; but if (as we believe) the preservation of professional freedom in this country depends very largely on the success of the present experiment, it is a pity that any doctor should appear to want it to fail. On the other side, however, we must remember that, in medicine as elsewhere, continual criticism is a necessity; and also of course that the English are apt to speak disrespectfully of what they hold most dear—unless, indeed, someone else does so. What any doctor says about the service does not, after all, matter nearly so much as what he does about the particular medical institution where he works. Granted their present faults, it is these institutions that give us so much cause for both pride and confidence.

3. *Lancet*, 1948, ii, 101.

Anticoagulants for Myocardial Infarction

WE make no apology for returning to the topical subject of the management of the effects of coronary occlusion or insufficiency. Since we last commented on this matter,[1] the Committee on Anticoagulants of the American Heart Association has published a study of 1031 cases. The authors of this important account—IRVING S. WRIGHT, CHARLES D. MARPLE, and DOROTHY FAHS BECK[2]—justify its exhaustiveness by pointing out that every year about 200,000 persons in the U.S.A. die from myocardial infarction and 600,000–800,000 suffer attacks. "Perhaps the greatest personal and social significance of myocardial infarction lies," they say, "in the large number of persons lost by death during their most productive years—years when their talents are most needed by their families, their professional or industrial groups and their nation." The figures of age-distribution emphasise this: 16% of the patients in their series were aged 40–49, and 35·9% were aged 50–59; and the patients were mostly males—87·3% of the first of these age-groups and 84·6% of the second. The 1031 patients were divided into 589 who received anticoagulant treatment and 442 who did not and who served as controls. Sixteen hospitals coöperated in the survey and used uniform methods of case-taking and treatment. The analysis of the symptoms shows that the well-recognised clinical picture is a correct one: pain, fall in blood-pressure, pyrexia (100°F or more), increased erythrocyte-sedimentation rate, increased pulse-rate, and a white-cell count of 9500 or more per c.mm. are the commonest findings; cardiac enlargement or failure and abnormal rhythms are less prominent.

It is very clear that the danger of myocardial infarction, once the patient has survived the first twenty-four hours, lies in thrombo-embolic complications; and it is also clear that the effectiveness of anticoagulant treatment lies in its ability to prevent these complications. The American team conclude that anticoagulants substantially reduce all types of complication whether intracardiac or extracardiac, including emboli originating in mural thrombi. From the high rate of thrombo-embolism in the first week of the illness and from the observed effects of delay in treatment, they recommend that anticoagulant treatment should be begun as soon as possible and the prothrombin level lowered as rapidly as possible. The anticoagulant treatment should last for at least four

1. *Lancet*, 1953, ii, 171.
2. Myocardial Infarction: its Clinical Manifestations and Treatment with Anticoagulants. By I. S. WRIGHT, C. D. MARPLE, and D. F. BECK. New York: Grune & Stratton. 1954. Pp. 656. $8.50. See also *Lancet*, 1954, i, 92.

weeks after the initial attack; and should thrombo-embolism occur, the treatment should be continued for four weeks from the last such incident. The team are in favour of long-term anticoagulant treatment for patients with a record of repeated myocardial infarction. Protection is greatest when the prothrombin-times are kept at between two and two and a half times the normal level (about 23% prothrombin or less). The association of anticoagulant therapy with reduction in the risk of thrombo-embolism, though noted at all ages, was greatest in the 50–69 age-group; but anticoagulants did not remove the upward trend of complications with increasing age. The data suggested that without anticoagulant treatment the risk of thrombo-embolism is greater in men than in women, but anticoagulant treatment reduces the incidence greatly in both sexes and rather more in men than women. Consequently the team suggest that anticoagulant treatment is suitable for all patients regardless of age or sex. The data support the view that anticoagulants are effective in both mild and severe cases; both types will benefit from maximum protection from the onset. The authors conclude that their results do not support the contention of RUSSEK and ZOHMAN [3] that "good risk" cases—i.e., those with no unfavourable signs at their first examination—do not need anticoagulant treatment. WRIGHT and his co-workers are quite clear that good-risk cases showed fewer thrombo-embolic complications when given anticoagulants, and they point out that the screening for good-risk cases involves a great possibility of error.

Provided that the prothrombin-time is kept at two to two and a half times normal, the danger of hæmorrhagic complications is small; lowering still further the prothrombin level increases the risk of hæmorrhage and gives no added protection against thrombo-embolism. To maintain a smooth level of prothrombin reliable laboratory control is essential, and the committee are not in favour of giving anticoagulants without such control. The hæmorrhagic complications during anticoagulant treatment have been exhaustively analysed. Some evidence of bleeding was observed in 12·9% of the treated patients; but it was also found in 5·2% of the control group, and in only 7·8% of the treated group was the bleeding ascribed to the anticoagulant. No less than 54% of these bleeding episodes were mild (mostly microscopic hæmaturia); 39% were classified as moderate; there were in fact only 4 severe bleeding episodes among the 577 treated patients considered, and in only 1 was the anticoagulant clearly the sole factor causing the bleeding. None of the clinically observed cases of hæmorrhage was fatal, but some unsuspected hæmorrhages were discovered at necropsy in fatal cases. Nevertheless the team believe that the benefits of anticoagulant treatment greatly outweigh the risk of hæmorrhage. Patients with complicating azotæmia or with renal diseases, and to a lesser extent patients with liver enlargement or myocardial failure, have a greater tendency to bleed; but the added risk is not great enough for anticoagulants to be withheld.

The data show clearly that administration of anticoagulants reduces the risk of death; during the period of observation only two-thirds as many patients per 100 died in the treated group as in the control group. (TUDHOPE and DONALD [4] have already described evidence suggesting that in survivors one month after myocardial infarction the mortality-rate during the subsequent eleven months is considerably lower among those who have received anticoagulants than among those who have not.) The reduction in deaths in the American series appears to be due primarily to the prevention of thrombo-embolic complications, since in 42% of the control group (compared with 23% of the treated group) death was preceded by clinically diagnosed thrombo-embolic complications. Furthermore the contrast in death-rates between the control and the treated groups was greatest in the second, third, and fourth weeks when anticoagulant treatment was most effectively maintained. The necropsy findings on patients who died showed that nearly three-quarters of the original infarctions were due to thrombi and were "potentially preventable with anticoagulant treatment, provided the need could have been anticipated and therapy instituted in time." Coronary insufficiency accounted for 15% of the cases, and 11% were attributed to miscellaneous or unknown causes. Only 3·4% of the original infarctions were due to subintimal hæmorrhages. Calculations showed that rupture of the heart or intracardiac hæmorrhage was an immediate or contributing cause of death in 2·4% of the control patients and in 4·1% of patients who had received anticoagulants; but in contrast the death-rate from thrombo-embolic complication was reduced five-fold in the treated group. All the same, the American team reasonably point out that the risk of intracardiac hæmorrhage should be reckoned with and watched for by clinicians treating patients with anticoagulants, and that by good management of the anticoagulant control this risk can be minimised.

It needs no great perspicacity to deduce from all this that the authors of the report are wholeheartedly in favour of anticoagulant treatment for *all* patients with myocardial infarction, whether mild or severe. They consider that treatment should be begun as soon as possible, using heparin if necessary for the first twenty-four to forty-eight hours, and be continued for four weeks, "provided no significant contra-indications are present and the facilities are available for meticulous supervision of its administration." These conclusions are the same as those reached by GILCHRIST and TULLOCH [5] from a study of 321 cases seen in Edinburgh over a seven-year period. The committee's report is concerned only with patients treated with dicoumarol or ethyl biscoumacetate; but the use of newer anticoagulants [6] will not change their conclusions, since these drugs make control more effective. Opposing the conclusions of IRVING WRIGHT and his school, RUSSEK and ZOHMAN [7] have reiterated their view that, by assessing eight important signs and symptoms, it is possible to classify patients into good and poor risks, and only the poor-risk cases need anticoagulant treatment. Of 1318 patients admitted to hospital with myocardial infarction, 46% were classified on the day of admission as good-risk cases; and RUSSEK and ZOHMAN contend

3. Russek, H. I., Zohman, B. L. *Lancet*, 1954, ii, 910.

4. Tudhope, G. R., Donald, A. C. *Ibid*, p. 465.
5. Gilchrist, A. R., Tulloch, J. A. *Brit. med. J.* 1954, ii, 720.
6. *Lancet*, 1954, ii, 742.
7. Russek, H. I., Zohman, B. L. *J. Amer. med. Ass.* 1954, 156, 1130.

that for this large proportion of patients the mortality and incidence of thrombo-embolism is so low that anticoagulant treatment, with its added risk of hæmorrhage, cannot be expected to improve the prognosis. They also point out that most of the deaths in the good-risk group occur in the first forty-eight hours, when anticoagulant treatment does not give protection, and thrombo-embolism after the first forty-eight hours is relatively infrequent. So RUSSEK and ZOHMAN estimate that only 30% of all patients with myocardial infarction require anticoagulant therapy. It is clear, from a series of questions and answers published by SCHNUR,[8] that American opinion is far from unanimous on this question. The majority are taking a middle course. HALPERN et al.,[9] for instance, administer anticoagulants in all cases for the first forty-eight hours, thereafter discontinuing this treatment where the prognosis is judged good. Others reach an immediate decision, withholding anticoagulants from patients with mild first attacks. But the answers to SCHNUR's questions show that, since the public knows of these drugs, it is often difficult to withstand the relatives' demand for their use.

Pulmonary Embolism

PULMONARY embolism, it is now realised, is much commoner than was formerly supposed. In the aged and enfeebled its supervention may be stealthy and easily overlooked; indeed, it may deserve the title of the acute disease most likely to escape detection. Sudden death from massive embolism after operation is familiar enough; and the case of the patient with obvious heart-disease or phlebothrombosis in the leg who begins to have pain in the chest, hæmoptysis, a pleural rub, and an abnormal shadow on the chest radiograph is rarely misdiagnosed. But often the clinical picture of pulmonary embolism is far less typical. Moreover, although good radiographs will nearly always reveal some abnormality,[10] radiographs of elderly obese invalids taken with a bedside apparatus are often not very helpful; and it is among such people that pulmonary infarction is most usual. Necropsy figures such as those published by MORAN [11] and TOWBIN [12] leave no doubt about the frequency of this complication. TOWBIN, for example, in 512 necropsies on the late inmates (mostly elderly folk) of a social-welfare institution at Columbus, Ohio, found emboli in the lungs of 25%, and of 34% where death had occurred after the age of 70. TOWBIN does not state exactly how many of these emboli had been diagnosed during life, but he makes it clear that many had been either overlooked altogether or mistaken for coronary thrombosis or bronchopneumonia. TOWBIN has been at pains to compare the pattern of illness and death in his institution with that in the surrounding city; and he concludes that a similar incidence of pulmonary embolism is to be expected during terminal illness in older members of the general population. Of course not every embolus discovered at necropsy has necessarily been the cause of death; in some the embolism may simply have been the coup-de-grâce in a chronic fatal illness. Nevertheless a disorder that is so common and so dangerous is a serious challenge, which is likely to grow in importance as the population ages and other immediate causes of death, such as infection, are gradually eliminated.

The problem of pulmonary embolism is threefold: how to prevent it, how to recognise it, and how to treat it. In the absence of heart-disease nearly all emboli come from clots in the deep veins of the legs.[13] Not all the causes of such venous thrombosis are clear; but there is little doubt that in elderly people one important cause is enforced rest in bed, especially when this has been brought about by an infection, for some infections are known to be accompanied by an increased tendency to clotting of the blood. Old folk tend to go to bed for comparatively slight illness, and in this they are often encouraged by well-meaning relatives. They should, on the contrary, be prompted to remain ambulant as long as possible. Postoperative phlebothrombosis is not easily prevented; early ambulation has not reduced its incidence. LAMBERT ROGERS [14] believes that pressure by the operating-table on the calves of the legs can obliterate the intermuscular veins and predispose to clotting, and conceivably this may also be true of the frequently flinty hospital bed-mattress. Pulmonary embolism from an unsuspected thrombus is particularly liable to occur when the patient first gets out of bed, and SHORT [15] has therefore suggested that anticoagulants should be given routinely during this danger period.

The recognition of pulmonary infarction depends on constant vigilance. Any older person confined to bed who suddenly begins to have unexplained pyrexia, dyspnœa, or chest pain should be suspected of having embolism and should be carefully examined for evidence of preceding phlebothrombosis. Infarction is often particularly quiet when masked by existing heart-failure; but sometimes its onset is betrayed by unexpected tachycardia or cardiac arrhythmia.[15] Once deep-vein thrombosis, with or without embolism, has been diagnosed, anticoagulants should be given unless there are strong contraindications. With careful treatment the mortality risk is probably no greater than 2% or 3%, even among older patients. The death-rate from pulmonary embolism after untreated femoral-vein thrombosis is of the order of 10%. Unfortunately fatal pulmonary embolism is often unheralded [16]; but if embolism has already occurred, anticoagulants will reduce the likelihood of further embolism. Intravenous trypsin has been used experimentally to dissolve intravascular thrombi, but it has not yet been proved to deserve a place in clinical practice.[17] When there has been repeated embolism despite adequate anticoagulant treatment, it may sometimes be necessary to tie a vein; but ligation of large vessels, such as the inferior vena cava, is not to be lightly undertaken, for the late sequelæ are often disabling.[18]

8. Schnur, S. *Ibid*, p. 1127.
9. Halpern, M. M., Lemberg, L., Belle, M., Eichert, H. *Ann. intern. Med.* 1954, **41**, 942.
10. Short, D. S. *Quart. J. Med.* 1951, **20**, 233.
11. Moran, T. J. *Amer. J. clin. Path.* 1947 **17**, 205.
12. Towbin, A. *J. Amer. med. Ass.* 1954, **156**, 209.
13. Bauer, G. *Lancet*, 1946, i, 447.
14. Rogers, L. C. *Congr. Soc. int. Chir.* New Orleans, 1949; p. 511.
15. Short, D. S. *Brit. med. J.* 1952, i, 790.
16. Marks, J., Truscott, B. M., Withycombe, J. F. R. *Lancet*, 1954, ii, 787.
17. See *Ibid*, p. 904.
18. Shea, P. C., Robertson, R. L. *Surg. Gynec. Obstet.* 1951, **93**, 153.

Annotations

ACTION ON AGENE

THE Minister of Food's announcement, reported on p. 53 of this issue, that manufacture of agenised bread is to cease at the end of 1955 is the tardy outcome of a disturbing discovery in 1946. In that year, Mellanby [1] found that agenised flour in large amounts induced "hysteria" in dogs; and it was shown to cause a similar disturbance in some animals other than dogs. Rapid progress was made towards the identification of the toxic substance.[2] Meanwhile a committee, set up to examine the suitability of this flour for human consumption, reported in January, 1950, that, though it had not been proved to be toxic to man, its use should be discontinued.[3] This recommendation the Government of the day accepted. But in the intervening five years no action has been taken; and in answers to parliamentary questions the failure to act has been variously ascribed to the inevitable delay in conversion of flour mills, to the need for finding a suitable alternative flour-improver, and to deferment of a decision pending the receipt of a report of an investigation under the ægis of the Medical Research Council. This report, to which the Minister of Food referred in his statement, confirms that agene-treated flour induces fits in dogs. The M.R.C. investigators examined four other means of flour-improvement—chlorine dioxide, potassium bromate, ascorbic acid, and an aeration process—and though these methods were found to have different effects on flour, the evidence was insufficient to call for the abandonment of any of them. These methods are to be kept under close scrutiny. Presumably millers will use one of the four in place of agene.

The facts included in the Minister's statement make us little wiser than we were at the start of 1950. But we can be thankful that the sensible action of banishing the agene process is at last to be taken.

METHYL-MERCURY POISONING

THE danger of methyl-mercury compounds has been known for nearly a hundred years.[4] Such compounds are manufactured in large amounts for the control of agricultural fungus diseases; and in 1940 Hunter, Bomford, and Russell [5] described four cases of poisoning in men engaged in this manufacture. Now, fifteen years later, one of the four has died, and the irrecoverable damage caused by these substances has been described.[6]

The destruction proved remarkable for its sharpness and selectivity. Circumscribed areas of the visual cortex on the medial surface of the occipital lobes were atrophic, and scattered small foci were present elsewhere in the cortex; similar sharply defined areas in the depths of some cerebellar folia had lost their granular layer of neurones, and secondary changes were present in the glia, the Purkinje cells, and the superficial layer of fibres; the cord and peripheral nerves were not affected. These changes account for the clinical signs of great general ataxia and extreme concentric reduction of the visual fields. The lesions differ conspicuously from those in the relatively acute stages in the rat and the monkey; here degenerative changes involved the spinal cord and peripheral nerves. If this is also the pattern in man it is apparently reversible; and the clinical picture indeed suggests that temporary involvement of the nervous system far exceeds the permanent damage.

This is the first demonstration in man of primary cerebellar degeneration due to an exogenous toxin; and methyl-mercury compounds are an important addition to the list of toxic substances with a precise localised effect on the brain. The extremely sharp localisation to the depths of particular cerebellar sulci is striking; such selectivity is a question sometimes of access, sometimes of physiological over-use, sometimes of a higher organisation and more complex and delicate structure of the cell and its function; but none of these explanations seems to apply here, and some chemical difference must be assumed in the affected cells of what, to the relatively crude eye of the microscope, seems a singularly uniform organ.

FIBRO-ADENOSIS AND BREAST CANCER

THE question whether cancer of the breast develops more commonly in patients with fibro-adenosis than in other women has never been satisfactorily answered. With the intention of settling it, Dr. William Kiaer [1] has examined 700 breasts from necropsy specimens obtained from women who, during life, made no complaint of their breasts; and in 33% of this series found histological evidence of fibro-adenosis. In the 700 breasts examined only 1 case of carcinoma was discovered; and he concludes that, unlike carcinoma of the prostate, latent carcinoma of the breast must be very rare. From a study of this material he divided fibro-adenosis into three grades, according to the severity of the histological picture. Next he made a histological study of 378 breasts in which there was a cancer; and 58% of these were found to have fibro-adenosis elsewhere. The association was particularly distinct with the intraduct type of cancer; furthermore, it was the grade-III (or severest) type of fibro-adenosis that was found most often in these cases, and in many a morphological transition from grade-III fibro-adenosis to breast cancer was observed microscopically. The fibro-adenotic changes were found to be more pronounced in the region of the breast adjacent to the cancer.

A further 334 cases of fibro-adenosis were examined from the clinical point of view. The age-distribution showed a peak between 35 and 49 years, and the left breast was found to be affected more commonly than the right. The menopause occurred earlier in this series than in the normal. Where histological control was available it was found that when the patient complained of a discharge from the nipple this was associated with a more severe grade of fibro-adenosis. There was no relation between pain in the breast and the grade of fibro-adenosis—pain being, Dr. Kiaer believes, an expression of the fibrosis. Of these 334 patients, 321 were followed up to see whether cancer developed more commonly in them than in the general population. Dr. Kiaer refers to Bloodgood's change of heart on this matter which he regards as typical: when Bloodgood was a histologist he thought that fibro-adenosis frequently led to cancer, but when he became a clinician he realised that this relation was far less obvious than histological evidence would suggest. Of the 321 patients who were followed up, 17 were watched for less than five years, 41 for between five and ten years, and 263 for more than ten years; 21 (6·5%) developed carcinoma of the breast during the period of follow-up. Histological evidence showed that the higher grades of fibro-adenosis, particularly grade III, were especially likely to lead to cancer; and furthermore excision of the grossly affected area did not confer protection. Dr. Kiaer is aware of the objection that his grade-III fibro-adenosis may be a form of cancer; but he thinks that this is very unlikely, because the latent period between the complaint of the symptoms of fibro-adenosis and the appearance of the

1. Mellanby, E. *Brit. med. J.* 1946, ii, 885.
2. See *Lancet*, 1953, i, 581.
3. *Ibid*, 1950, i, 227.
4. Edwards, G. N. *St. Bart's Hosp. Rep.* 1865, i, 141; *Ibid*, 1866, ii, 211.
5. Hunter, D., Bomford, R. R., Russell, D. S. *Quart. J. Med.* 1940, 9, 193.
6. Hunter, D., Russell, D. S. *J. Neurol. Psychiat.* 1954, 17, 235.

1. Relation of Fibro-adenomatosis ("Chronic Mastitis") to Cancer of the Breast. Copenhagen: Munksgaard. 1954. Pp. 159. D.Kr. 30.

cancer was generally so long and because many of his cases of grade-III fibro-adenosis never developed a metastasising lesion.

The whole series is analysed statistically by Arne Nielsen, an actuary from the Danish cancer registry, who concludes that breast cancer is 4–5 times as common in patients with fibro-adenosis as in the normal population. Whether or not this estimate is correct, it seems clear that there is some increased tendency for cancer to develop in patients with fibro-adenosis.

RECOGNITION OF TABLETS

WE recently referred to the difficulty of identifying medicinal tablets.[1] This may sometimes be a vital matter, as when an almost empty tablet-box is found beside an unconscious patient. Cooper [2] has devised a series of simple chemical screening tests by which many common drugs can be quickly recognised. Six reagent solutions are required. A few milligrammes of the tablet material is powdered and placed in small heaps on filter-paper. A drop of test solution is added to each heap of drug and any colour change is noted. By reference to a chart the drug can usually be identified or allocated to a small group. If the solutions are already prepared the test takes ten minutes. This is an important step forward. But it might be objected that the tests, although they have been "streamlined," require time, care, and some apparatus; that the reagents do not keep long and at least some of them may have to be prepared fresh for each test; and that the procedure is inadequate for identifying compound tablets. Ideally the responsibility for ensuring that tablets are readily identifiable should rest with the maker. Perhaps manufacturers should consider stamping each tablet with an agreed code-number.

TUBERCULOUS PLEURAL EFFUSIONS

TUBERCULOUS pleurisy may seem at the time a short-lived, though uncomfortable, illness. But in many patients manifest pulmonary tuberculosis develops later. Estimates of the proportion vary,[3] but apparently 20–30% will require further treatment in the next five years. The pleural effusion is commonly a gross manifestation of small lung lesions. These may not be apparent in the ordinary chest radiographs; but tomography is said to reveal them in about 12% of cases.[4] The future of the patient depends on the behaviour of these lesions rather than of the pleura.

Long rest and protracted convalescence are usually recommended; but there seems some doubt whether this reduces materially the risk of breakdown. Mitchell [5] studied 186 patients treated with varying periods of rest in bed. The rate of breakdown in the first five years was 22% among those rested in bed for less than three months and 19% in those rested for longer than six months. Emerson [3] found that in 22% of a group of young adults who had had pleural effusions further manifestations of tuberculosis developed in the first two years, even though they had had three months' complete rest in bed. He points out that the mean morbidity-rate in the many previously reported series is 30% for those treated with long-continued rest and 29·9% for those treated without this.

Mackay-Dick and Rothnie [4] advocate repeated aspiration of the effusion and breathing exercises, in order to reduce the risk of later respiratory impairment. They claim that the effusion disappears more quickly; but their evidence is not entirely convincing. Even if this claim is correct, there is no evidence that the duration of the effusion influences the degree of respiratory disability. In any event, it is rare to find any serious disability at all, and the pleura seems to have an astonishing ability to heal. It is undoubtedly more important to try and prevent pulmonary relapse; and Mackay-Dick recommends treating all patients for six months with antibacterial drugs. There is much to be said for protracted drug treatment, and possibly six months is not enough. There are, however, arguments against even six months' treatment. Some might maintain that it is better to keep the patient under close observation and administer drugs promptly to the 30% who relapse, thereby sparing the remaining 70% the disadvantages of protracted drug therapy. It is theoretically possible that the bacilli may become resistant to the drugs during the initial course, and treatment of subsequent relapses will accordingly be less effective; thus although few patients may relapse the same number may die of the disease or have long illnesses. Indeed, it is not even known whether antibacterial treatment reduces relapses. This would not have been difficult to establish by a controlled trial in the early days of drug treatment; but such a trial would now be difficult and might be unjustifiable. Most physicians will probably prefer to judge each case individually.

1. See *Lancet*, 1954, ii, 697.
2. Cooper, P. *Pharm. J.* 1954, **173**, 481.
3. Emerson, P. A. *Brit. J. Tuberc.* 1954, **48**, 261.
4. Mackay-Dick, J., Rothnie, N. G. *Tubercle*, 1954, **35**, 182.
5. Mitchell, R. S. *Amer. Rev. Tuberc.* 1953, **67**, 421.

RABIES IN GERMANY

AN epizootic of rabies, described as more serious than any in Western Europe for at least a century, has been spreading westwards across Germany and now threatens neighbouring countries. It was discussed at a recent meeting of the Public Health Committee of the Brussels Treaty Organisation.[1]

After the first world war, infected dogs, wolves, and foxes from the east caused an outbreak on the eastern borders of Germany. This reached a peak in 1924, but veterinary police measures thereafter kept infection beyond the frontiers until the second world war, when it again increased. The disease seems to have been prevalent in Eastern Germany from 1945, particularly in foxes and wolves, which could not be shot because the people lacked firearms. By 1948 the epizootic had passed the Schleswig-Holstein border in the north and reached Austria in the south, and had passed from foxes to dogs, though it preserved its essential difference from earlier outbreaks—namely, the infection of wild rather than domestic animals.[2] In 1951 Eastern Bavaria was infected and by last spring large areas from the Danish frontier to Hesse, and some districts bordering the Dutch and Belgian frontiers, were declared infected or suspected. Thus in about ten years the epizootic had spread stealthily right across Germany, though most of the southern parts of Western Germany remain free.

Though the disease is more easily detected in domestic than wild animals, two-thirds of the material diagnosed as rabies in the government veterinary laboratories has come from wild animals (foxes, badgers, roe-deer, hares, rabbits, weasels, wild boars, squirrels, rats, buzzards, and magpies): cats, dogs, cattle, and other domestic animals have provided the remainder, though in herbivores infection is rare. Incidence is highest in winter and spring, and rivers seem to be no obstacle to spread. The chief diagnostic signs are the well-known changes in behaviour. Thus foxes lose their fear of man and may be seen walking in a village street: they have even allowed themselves to be picked up by children. Refusal of food, and biting of inanimate objects are characteristic, as are changes in voice. Buzzards, in which Negri bodies were afterwards found, have dashed themselves to death against windows. In material from animals in which rabies has been clinically confirmed, Negri bodies have been found in about 75%.[3] In addition, the intracerebral

1. Netherlands report to the Public Health Committee of the Brussels Treaty Organisation. Unpublished.
2. Zunker, M. *Bull. Off. int. Epiz.* 1954, **42**, 83.
3. Ruppert, F. *Ibid*, p. 70.

and intramuscular injection of suspect material into white mice is employed.

Only one case of human rabies has occurred in Western Germany, but the number of people vaccinated is large and rapidly increasing—i.e., 423 in 1953 and 828 up to June 5, 1954, the greater part from Lower Saxony, North Rhine Westphalia, and Hesse. Vaccination is recommended for all who have been bitten, scratched, or licked by infected or suspected animals, who have handled them, or who have been in contact with their saliva (e.g., on muzzles or pieces of wood). No cases of postvaccinal paralysis are reported and hyperimmune serum has not been employed.

The basic control measures are first, notification; secondly, destruction of foxes and badgers by shooting and cyanide fumigation of the earths; and thirdly, declaration of infected or suspected areas. In such areas dogs must be kept tied up for three months and cats kept at home: any found at large are shot, and, since sooner or later a cat will "walk by itself," most cats in these areas have been killed. Energetic measures against foxes—3000 have been destroyed in the province of Detmold (North Rhine Westphalia) in eight months—seem to have been effective in stopping the epizootic. Education of the public is regarded as very important.[4] It is noteworthy that vaccination of dogs has been rejected as a control measure on the grounds that (*a*) wild animals are chiefly affected; (*b*) cats are considered more dangerous than dogs; (*c*) police measures have been successful in the past in controlling infection in dogs; (*d*) vaccinated dogs must still be controlled, because their saliva is infectious even though they are protected against clinical development of the disease; (*e*) the public would be less likely to coöperate in other control measures if dogs were vaccinated; and (*f*) the cost and effort in vaccinating all dogs would be very great. For these reasons the vaccination campaigns such as have been successful in Hungary, Japan, Israel, and Malaya[5] are not thought to be applicable to conditions in Western Germany.

Denmark has so far remained entirely free, thanks perhaps to destruction of foxes along the frontier and mass vaccination of dogs in frontier areas. It seems unlikely, however, that such measures will stop the epizootic from crossing the long western frontier of Germany.

For us the moral is clear. Quarantine has fallen into disuse as a prophylactic measure against many diseases, but against animal rabies it remains our great protection. Anyone smuggling in a dog from Western Germany commits not only an offence but a serious crime against the canine—and perhaps the human—population in this country.

ANTIGENICITY OF COLLAGEN

AMONG connective-tissue diseases rheumatic fever has always seemed to have the best claim to an immunological origin. Yet although the evidence implicating the group-A hæmolytic streptococcus is strong, no particular bacterial antigen or antibody has been identified as a specific causal factor. Alternatively the antigen may lie in, or be derived from, the connective tissue itself, and auto antibodies may be the cause of lesions involving, among other possible components, collagen. Hitherto collagen (which is, by bulk, the chief component of connective tissue) has been thought to be non-antigenic, as is its soluble derivative, gelatin; and its immunological harmlessness is presumed in its use (in a somewhat modified form) as surgical catgut. Reticulin, however, which in some ways resembles collagen, probably has immunological activity; the work of Hill and Cruickshank[6] on fluorescein-labelled tissue antibody strongly suggests that the antigenic component in kidney glomeruli, for example, is reticulin.

Evidence is now forthcoming that soluble collagen is also antigenic. Watson et al.[7] have prepared acetic-acid extracts of rat-tail tendon with special care to prevent denaturation, and have immunised rabbits by intraperitoneal infusion of the extracts. After somewhat prolonged immunisation some of the rabbits produced antibody giving specific complement-fixation results with the immunising solution. Their experiments are designed to meet the criticism that the antibody produced is not specifically directed towards collagen, but to an accompanying impurity; and their results justify their conclusion that they have obtained an antiserum specific for the acetic-acid-soluble component of collagen. Particularly striking is their demonstration that, whereas the addition of normal rabbit-serum to the acid-collagen solution led to the reconstitution of fibres which sometimes showed the characteristic collagen periodicity in electron micrographs, the addition of the specific rabbit-antiserum gave rise instead to a globular form of precipitate which never included fibres with periodic banding. They also describe evidence (and this, if confirmed, is another important new finding) that collagen exhibits species specificity.

These results clearly hold promise of an effective method of investigating connective-tissue reactions to specific antibody.

PRIVATE ADVENTURE MONEY

SINCE it was founded in 1943 the Nuffield Foundation has allocated grants of over £5 million, and with its annual report for 1953–54[8] it publishes a full survey[9] of all the grants made during its first ten years. These reports appear at a moment when the great American foundations face Congressional criticism. Like their creators, the Carnegie, Rockefeller, and Ford Foundations are big enough to speak for themselves; but their generosity has been international, and British scientists can gratefully apply to them all the words Dean Rusk has written about the Rockefeller Foundation:

> "As a social institution, it reflects the application to philanthropy of the principles of private initiative and free enterprise, under public policies which have long recognized the benefits of such activity to a free society."[10]

Though research, education, and welfare services in this country receive more and more help from the State, there is still plenty of room here for imaginative experiment. But in some of the other countries of the Commonwealth the gaps are even more conspicuous; and in the past few years the Nuffield Foundation has accordingly given more "private adventure money" to people and institutions in overseas parts of the Commonwealth. One of the most important of these allocations has been grants of £250,000 to university colleges in Colonial territories. This generous help will give the foundation a particular pleasure, which we all share, in the announcement last month that the University of London has confirmed the conferment of M.B., B.S. degrees on thirteen students of the University College of the West Indies who passed their final examinations in October.

As one quinquennium ends the next begins, and the report also outlines the foundation's plans for the next five years. As its special interest in medicine, it has chosen the investigation of the chronic rheumatic diseases and the causes of mental and physical defects "which throw so heavy a burden on the family and the community." It also shares Professor Adrian's belief in the importance of the development of the social

4. *Bull. World Hlth Org.* 1954, **10**, 848.
5. *Tech. Rep. Wld Hlth Org.* no. 82, April, 1954.
6. Cruickshank, B., Hill, A. G. S. *In* Nature and Structure of Collagen. Edited by J. T. Randall. London, 1953; p. 27.
7. Watson, R. F., Rothbard, S., Vanamee, P. *J. exp. Med.* 1954, **99**, 535.
8. Nuffield Foundation. Ninth report. 1954. Pp. 141.
9. Nuffield Foundation. Report on Grants, 1943–53. Pp. 319. Both obtainable from the foundation, Nuffield Lodge, Regent's Park, London, N.W.1.
10. Rockefeller Foundation Annual Report. 1953. President's Review, p. 8.

sciences, and it hopes to encourage fundamental research into such subjects as the family. For instance, Belmont Hospital, Surrey, over three years, is to receive up to £19,500 for a study of the family and social background of some patients in the unit lately described in our columns by Dr. Maxwell Jones.[11] The foundation's interest in the problems of old people is of long standing, and here it hopes especially to help in research and practical experiment in the employment of elderly workers.

ULTRASONIC IRRADIATION OF THE FRONTAL LOBES

THE effects of ultrasonic waves on biological systems have interested experimentalists for nearly thirty years. In the past ten years they have been used to damage various parts of the brain in living animals. Lynn and Putnam [12] found that neurones were more severely affected than glial cells, and that blood-vessels suffered least. In their experiments the scalp and skull were not opened, and radiation intense enough to harm the brain caused also dry gangrene of the superficial tissues. The mode of production of lesions is obscure. The absorption of ultrasonic energy by homogeneous liquids is not fully understood, and conditions in the brain must be even more complex.

In what appears to be the first report of the use of ultrasonic energy in neurosurgical practice, Lindstrom [13] describes its effect in twenty cases in which the prefrontal lobes were irradiated—in seventeen cases of malignant disease for relief of intractable pain, and in three cases of organic nervous disease with psychiatric complications. Preliminary trials in rabbits showed that the cerebral effects were uselessly variable unless the scalp and skull were opened.

In dogs and rabbits it seemed to matter little whether the dura also was reflected. The transmitting quartz crystal, $1^1/_4$ inches in diameter, oscillated at 1000 kc. per second. The waves were conducted to the brain through Ringer's solution percolating through a plastic cup, either cylindrical or conical to focus the beam. Maximum energy was estimated to be 7 watts per cm.^{2} cross-section area of beam near the crystal. The aluminium face of the oil-filled crystal container was separated from the brain by 1·5–4·0 cm. of Ringer's solution. In the animal brains lesions were found mainly in the white matter, following especially the contours of its junction with the overlying grey, which was often apparently unharmed.

In patients $1^1/_4$–$1^1/_2$ inch buttons of bone were removed from the frontal bone, 1 cm. in front of the coronal suture and in line with each pupil. The beam was aimed in the direction of the tip of the anterior horn of the ventricle on each side. Exposure-time was four to seven minutes with dura open, seven to fourteen minutes with dura intact. Fourteen of the brains were later obtained for anatomical study, when the lesions were between nineteen days and seven months old. Detailed descriptions are promised later.

Macroscopically, most brains appeared normal. Microscopically the inconspicuous cortical damage was consistent with the use of diathermic coagulation for dural bleeding. Scattered small foci of gliosis were found in the white matter, especially near its junction with the cortex, near blood-vessels, and near the tip of the ventricle. Yet, notwithstanding the relatively slight structural changes, ten of the seventeen patients with painful malignant disease were completely relieved, and four more were partly relieved, of their complaints.

The indications for destructive operations on the frontal lobes will continue to be debated. All parties to the debate will need to take this new method into account. It is not too much to ask that no neurosurgeon should use it on his patients without having standardised the performance of his apparatus experimentally. The ultrasonic method does seem to offer new possibilities of inflicting damage which, presumably maximal at first, may be partly reversible, so that the permanent residual damage is very much less than that caused by surgical lobotomy. If further clinical and pathological experience confirms the results in this small series, will it not suggest the possibility that temporary lesions may break up, for example, some habitual mental attitude, and that this need not return when neuronal structure and function are later partly restored?

11. *Lancet*, 1954, ii, 1277.
12. Lynn, J. G., Putnam, T. J. *Amer. J. Path.* 1944, **20**, 637.
13. Lindstrom, P. A. *Arch. Neurol. Psychiat.* 1954, **72**, 399.

LYMPHŒDEMA PRÆCOX

THE lymphatic circulation, carried as it is in fine transparent vessels, has been largely neglected by clinical investigators, other than those interested in cancer dissemination. This is due partly to the difficulty of displaying lymph-vessels and partly to the lack of an adequate clinical method for determining their functional efficiency. Kinmonth [1] has reviewed some of the methods at present in use.

Patent-blue V is a convenient dye for the study of lymphatic pathways, and can safely be injected into the subcutaneous or deeper tissues. "Streamers" of dye-filled lymphatics can be seen to leave the injection site, and massage or limb movement forces the dye into the regional lymph-nodes. The blue tinge following superficial injection disappears in forty-eight hours. Kinmonth has shown that dye injected into the interdigital spaces of the normal foot or hand is quickly demonstrable in the groin or axilla, and similarly it will outline the lymphatics in the spermatic cord, breast, or mesentery. Sometimes a lymphatic revealed by patent-blue V has been successfully dissected out and injected with a radio-opaque material, such as diodone.

In the normal limb the diameter of the lymphatic trunks, which anastomose and bifurcate as they approach the root of the limb, remains relatively uniform. But in lymphœdema præcox [2] the lymphatics in half the patients are tortuous, dilated, and incompetent. They are valveless and may be reasonably compared to varicose veins; and dye techniques have revealed incompetence of the deep lymphatics in addition to the well-recognised superficial lymphatic abnormality. Jepson et al.[3] attempted to assess the removal-rate of tissue-fluid, and thereby lymphatic efficiency, by estimating the absorption of radioactive protein; and Kinmonth [1] has applied this technique to lymphœdematous limbs, and suggests that in these dispersion of the tagged protein is slower than normal. Analysis of tissue-fluid in lymphœdema reveals high levels of protein, except in cases of chylous reflux when the œdema fluid has a high fat content.

These findings in the lymphœdematous limb should be kept in mind when the question of operation arises. An operation designed to repair the anatomical and functional defect seems to be out of the question, since both deep and superficial lymphatics are at fault; the introduction of valved lymphatics by a skin bridge from the abdomen to the thigh only nibbles at the problem. Apparently the surgeon must rely on excisional surgery, by which the œdematous subcutaneous tissue is radically excised and the leg shaped for cosmetic effect. Development in skin-grafting methods—for example, the use of the electric dermatome—have greatly simplified skin replacement. But such major operations, which are often associated with considerable blood-loss, must be kept for the occasional case where the leg is so huge that it handicaps the patient mechanically.

Prof. ROBERT CRUICKSHANK has been appointed principal of the Wright-Fleming Institute of Microbiology in succession to Sir Alexander Fleming, F.R.S., who has retired. Professor Cruickshank will continue to hold the chair of bacteriology in St. Mary's Hospital Medical School.

1. Kinmonth, J. B. *Ann. R. Coll. Surg. Engl.* 1954, **15**, 300.
2. See *Lancet*, 1954, i, 766.
3. Jepson, R. P., Simeone, F. A., Dobyns, B. M. *Amer. J. Physiol.* 1953, **175**, 443.

Special Articles

OBSTETRICS AND PSYCHIATRY *

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OBSTETRICS has the unique distinction of being the only branch of clinical medicine which concerns itself predominantly with healthy human beings, and occupies itself principally with assisting a physiological process rather than with interrupting one which is pathological. Psychiatrists, on the other hand, are generally assumed to devote their interest to patients whose symptoms make them appear so remote from their fellow human beings that they are thought of as *aliénés*; a psychiatrist, at any rate in the eyes of those who call him an alienist, appears to occupy himself with "foreigners," which means, as every Englishman knows, people who are far from normal.

When I say that, nevertheless, obstetrics and psychiatry share an important area of common interest, I am not referring merely to the puerperal psychoses. The puerperal psychoses are, to the psychiatrist, important chiefly as the presenting symptom of a much larger group of psychological problems associated with childbirth which, like the main bulk of an iceberg, are not so easily visible. (Indeed psychiatrists would suggest that the only thing common to the psychoses of the puerperium is the fact that they occur during the period after childbirth; for they include almost every type of psychosis which may occur at any time of life.) The psychoses arising in childbirth or any other situation are outnumbered, at any rate in the Western countries, by the psychoneuroses.

The fact that this is still little recognised by physicians who are not psychiatrists arises partly from the deficiency in this respect of most current medical education, but also from the fact that the manifestations of a neurosis are little evident to the observer and may easily be ignored by everyone, except of course the patient; whereas the destruction of the personality which accompanies a psychotic illness leads to disturbances of behaviour which even the most obtuse observer will perceive.

But whether a patient be suffering from the comparatively rare condition of psychosis or the far more common one of psychoneurosis, the psychiatrist as he takes his history cannot fail to be impressed by the frequency with which he finds the occurrence of pregnancy and birth as one of the ætiological threads in the weaving of the illness, whether it be the pregnancy of the patient herself, or the pregnancy or birth of others intimately involved in the patient's life situation.

STRESS

Whereas it was formerly supposed that mental illness was hereditary, we would now prefer to say that what is inherited is not the illness, but the possibility of developing it. Whether a person who inherits this possibility does in fact develop the disorder depends on the emotional stresses of his life experience, and his reaction to these stresses depends partly on the experiences themselves and perhaps partly also on another hereditary factor of general resistance—of capacity to adapt constructively to such emotional stresses.

Emotional stress, in the sense of the psychiatrist, can best be considered as a sudden demand on the individual for adaptation to a radically changed pattern of human relationships, and the capacity to react to this change is influenced by past relationships all the way back to childhood. In this respect there is no change more drastic in its effects on all within the immediate family circle than the birth of a new human being. The emotional stresses with which the psychiatrists are concerned in the ætiology of psychiatric disorders are not hurricanes, floods, wars, and the other relatively rare cataclysms which the insurance companies refer to as "acts of God," but the emotional stresses of adaptation to those suddenly and radically changed intimate relationships which, far from being rare, are the inevitable lot of every human being.

It will be evident that by far the most important agents of emotional stress in this sense are the ubiquitous phenomena of birth and death. Because of this, all human societies from the dawn of history have evolved ceremonies and rituals to support their members through the stress of emotional adaptation which the beginning or the ending of a life imposes upon others and the stresses which arise at all those steps on the path between the beginning and the end in which the individual's relationships are suddenly and drastically changed. Birth ceremonies, puberty rituals, initiation procedures, marriage ceremonials, and burial rites are in fact the intuitively devised prophylactic measures by which societies temper the emotional winds that blow on those suddenly shorn of old relationships or forced to adapt to new ones. In our sophisticated Western cultures these ceremonies tend to wilt under our scientific criticism of what we call superstition—and so we are left with the stresses but no communal mechanisms for helping us to adapt to them—unless like the *Times*, with its obstinate and conservative sense of reality, we can remember in our clinical practice that births, deaths, and marriages are front-page news for the individual human being, and that politics and international affairs can wait until p. 8.

RÔLE OF THE OBSTETRICIAN

Our Western societies have demanded of the obstetrician the utilitarian function of preventing death in childbirth and since the days of Semmelweis the obstetrician has lived up to this expectation with a success to which the maternal-mortality rates of the Western world bear ample witness. But the original social function of the folk midwife of a primitive tribe was, I suspect, probably not that of the scientific obstetrician—to protect the woman and her child from death in childbirth—but rather to support the mother and her family through the processes of psychological adaptation demanded by a new birth. Even this more modest function, however, may well have made its indirect contribution to the far more difficult tasks of modern obstetrics, when we remember the extraordinary rarity in primitive peoples of primary uterine inertia, or failure of lactation—those two bugbears of Western obstetric practice.

The Western science of obstetrics has excelled in the new function of the prevention of death; and yet perhaps in doing so, at any rate in the half-century which has recently passed, it has tended to forget the emotional needs of the mothers and babies who lived. It is immensely to the credit of the specialty that the balance is now so rapidly being redressed and that some obstetricians, having brought under control the physical hazards of childbirth, are now turning their attention to the psychological stresses it entails.

The current interest in the training of the pregnant woman for active participation in childbirth, the development of "rooming-in," and of self-demand feeding practices show that the obstetrician, having relegated death to the position of a minor risk in childbirth, is capable of continuing to develop his function of helper in a normal biological process by fostering the psychological readaptation for which that process calls.

* From a paper read to the International Congress of Obstetrics and Gynæcology, Geneva, July, 1954.

RÔLE OF THE PSYCHIATRIST

"But where," you may ask, "does the psychiatrist come into all this?" To which I can only reply "He comes in too late." He sees the end-results of the failure of that adaptive psychological process—and he sees them at a time when the failures are consolidated in the form of an established neurosis or psychosis; when only extensive therapeutic endeavour can change the picture. Yet it is evident to him that, before that state arose, in every patient's case there was a period of fluidity, of plasticity, when very simple measures might have tipped the scale in the opposite direction. This was the period during which pregnancy and the birth of a child first threw on the family constellation a demand for psychological adaptation to which it finally failed to respond constructively. At this period it is not the psychiatrist but the obstetrician and the obstetric nurse who have the opportunity for action; but perhaps the psychiatrist can help to train them to make the best of this opportunity.

He can tell them something of the normal anxieties and psychological preoccupations of pregnancy, the deep archaic fears that are stirred by this primitive biological experience: fears which seem worlds away, or perhaps I should say centuries away, from the everyday life of the Western world. The idea of the "evil eye," for instance, so long ago discarded as a superstition in our societies, feels like a reality at some time or other to many pregnant women. Mood changes that affect temporarily, but deeply, the woman's attitudes to her husband or her unborn child. Her gruesome fears about her own body or that of her unborn baby. All these are among the normal abnormal thoughts of many pregnant women.

Ignorance of the natural history of the psychological aspects of maternity also causes problems for many a woman who suffers unnecessary anguish and sometimes a permanent twist of attitude as the result of the latent period of absence of feeling for her newborn child—not knowing how normal this is, and that within a few days or weeks her motherly feelings towards her infant will suddenly mature with overwhelming force.

The psychiatrist can also offer to the obstetric worker techniques for resolving or dissipating such anxieties. It is heartening to see that the skills developed by the psychiatrist in the field of group psychotherapy are beginning to be used by obstetric workers in therapeutic discussion groups for pregnant women and young mothers in which these normal archaic anxieties to which I have referred can be worked through.

At this point some one might interject: "Why bother? The average woman and her husband cope with the psychological readaptation to childbirth without our aid." To which the psychiatrist would be tempted to retort a trifle tartly that the same is probably true of the physical hazards of childbirth, and that, in the one field as in the other, it is during the antenatal period that we must try to discern those whose risk, either physical or psychological, is greater than the average. Certainly some pregnancies raise greater psychological problems than others, either by virtue of the woman's previous experience of a pregnancy that ended in catastrophe, or —even more serious—where it was secretly self-terminated. Most dangerous of all is probably the pregnancy which the woman failed to terminate. Her previous personality is an equally significant factor. The identification in the antenatal clinic of a woman with a markedly immature, dependent, and infantile personality is perhaps therefore as relevant a part of the antenatal examination of the future as the recognition of a contracted pelvis was in the past; both call for special antenatal prophylactic measures.

All this, from the psychiatrist's point of view, is important enough with the birth of a normal infant, but it becomes doubly so with a dead baby or an abnormal child. A woman who has invested the emotions of nine months' pregnancy and a labour in what proves to be an abnormal child, is from a psychological standpoint, in great danger—and yet, at the same time, much more accessible to help than she will be six months later. The person who can most easily help her, by virtue of his existing relationship with her, is her obstetrician. Therapeutic discussion at this point may change the whole future development of the child by preventing the mother's relationship with him being wrecked on the scylla of rejection or the charybdis of guilt-ridden overprotection.

The obstetrician and psychiatrist have, I believe, a duty to collaborate to ensure that obstetricians of the future are well equipped, by the training we give them, to cover this new, and yet very old, aspect of their specialty.

SWEEP-FREQUENCY METHOD OF TESTING THE HEARING OF SCHOOL-CHILDREN

THE following statement has been prepared by Prof. A. W. G. EWING at the request of the Medical Research Council's Committee on the Educational Treatment of Deafness:

In a recent investigation it was found that approximately 70% of pupils in English schools for the deaf and partially deaf have suffered from their handicap since before the age of two years. From the Ministry of Education's returns and from the results of recent surveys it seems that nearly all deaf children are admitted to special schools by the age of seven years, but that the ascertainment of partial deafness as a cause of educational retardation is at present less effective among children under seven than among those who are older.

The sweep-frequency technique has been shown to be a reliable and efficient method of making screening-tests of the hearing of five and six year old school-children. A pure-tone audiometer is used and, when the range of frequencies that are used is extended from 250 to 6000 cycles per second, early symptoms both of conductive and of perceptive deafness can be detected. It has been established that a sweep check over this range of frequencies at 15 decibels above normal threshold of detectability is more thorough and reliable as a screening-test than the use of word material (as in the test by gramophone audiometer) the loudness of which cannot be monitored satisfactorily for this purpose. The fading-intensities, called-number test has been shown to be sometimes ineffective for the detection of high-tone deafness.

Audiometricians who have been trained to work with young children are able to make a sweep check of auditory acuity, as an individual test, at a rate of three minutes per child. It has been shown that extraneous noise in a room in which a screening-test of hearing is to be made should not exceed about 30 decibels. The sweep-frequency test can be made in a small room. When it is necessary to make screening-tests of children's hearing in school buildings it is much less difficult to find small rooms that are quiet, in schools, than large rooms.

The sweep-frequency test can be made immediately or soon after children are first admitted to school, whereas the gramophone audiometer test, as normally administered, is a group test, in which children are required to write down numbers that they hear. It cannot therefore be used with children younger than eight years. The sweep-frequency test is very valuable in screening out children who are likely to need hearing-aids and special educational treatment, before they have been exposed to the risk of educational subnormality as a result of defective hearing.

A comparative study of the relative reliability of the sweep-frequency and gramophone audiometer tests, when both were administered to six-year-old children individually, showed the sweep-frequency tests to be superior. The called numbers that are used in the gramophone audiometer test involve a constrained context and are therefore often recognisable by children suffering from loss of hearing to a significant degree.

HOSPITAL COSTING

THE Hospital Costing Returns for the year ended March 31, 1954, have now been published by the Ministry of Health.[1] They cover some 2500 hospitals in England and Wales, and are based on the headings of the hospitals' financial accounts. The general pattern of the tables is the same as in previous reports, but the analysis is even more detailed, and the returns from each hospital are now tabulated under some 47 headings. A working party set up by the Minister is still deliberating upon a more informative system of costing; meanwhile the costs for outpatients continue to be unavoidably included with those for inpatients, and in the calculations five outpatient attendances have again been taken as equivalent to one inpatient day—a questionable assumption, as we have already pointed out.[2] On the other hand, the additional information does allow more just comparison to be drawn between hospitals of equivalent status.

The accompanying table shows the steady rise, over the last four years, in the national average costs per

HOSPITALS ADMINISTERED BY REGIONAL HOSPITAL BOARDS AND HOSPITAL MANAGEMENT COMMITTEES

Classification of hospital	Year ended March 31											
	1951			1952			1953			1954		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
General:												
1–50 beds	..			12	14	9	13	13	5	14	7	8
51–100 beds	..			14	7	2	15	7	5	16	1	3
101–300 beds	13	10	3	14	13	3	15	10	6	16	2	4
301–900 beds	..			14	11	7	15	12	1	15	19	1
Over 900 beds	..			10	9	10	11	8	11	11	16	3
All hospitals	13	10	3	14	5	11	15	4	9	15	15	5
Mainly general	11	12	3	12	10	10	13	4	7	13	16	1
Mainly chronic	6	18	4	7	5	1	7	12	10	8	6	8
Chronic	5	15	5	6	0	0	6	11	6	7	0	2
Convalescent	6	15	9	6	12	11	7	11	4	8	3	0
Isolation	15	11	1	17	0	1	17	0	0	19	9	2
Maternity	16	9	5	16	19	2	17	13	1	18	0	5
Mental	3	15	11	4	1	1	4	8	6	4	12	6
Mental deficiency	3	11	4	3	17	1	4	4	4	4	8	11
Orthopædic	9	17	0	10	15	3	11	13	0	12	9	11
Tuberculosis	8	17	2	9	6	7	9	19	5	10	8	1
Tuberculosis and isolation	12	11	8	13	3	8	13	5	7	14	1	5
Children (general)	..			..			13	17	2	15	6	4
Ear, nose, and throat	..			..			14	6	4	15	5	2
Eye	..			..			12	9	3	12	15	4
Eye and ear, nose, and throat	..			..			15	5	1	15	17	11

week of patients in the main types of hospitals (the figures are adjusted for notional outpatient expenditure, and exclude returns from teaching hospitals). For London teaching hospitals classified as "general," the average cost (computed on the same basis) was £25 4*s.* 2*d.* in 1953–54, compared with £24 18*s.* 8*d.* in 1952–53. Equivalent figures for provincial teaching hospitals were £19 2*s.* 9*d.* (1953–54) and £18 13*s.* 9*d.* (1952–53).

The costs vary considerably with the size of the hospital and with the regional area concerned. Thus in 1953–54, in the North West Metropolitan region, the average cost in hospitals of 1–50 beds was £16 17*s.* 6*d.* per patient per week, while in the same region the figure in hospitals with 301–900 beds was £20 9*s.* 10*d.* Equivalent figures for the Newcastle region were £12 1*s.* 3*d.* and £15 1*s.* 9*d.*

The Minister, in drawing the attention of hospital authorities to the returns, points out that in the past they have proved a useful stimulus to the elimination of extravagances, and to the more efficient use of available funds. Clearly they will serve their purpose even better when the long-awaited improvements in methods of costing are eventually introduced.

1. Hospital Costing Returns: Year ended March 31, 1954. H.M. Stationery Office. Pp. 123. 17*s.* 6*d.*
2. See *Lancet*, 1952, i, 1243.

Points of View

INSTITUTIONAL MEDICINE

From the Posthumous Papers of

Sir JAMES SPENCE*

IT is, I think, one of the inherent peculiarities of an Englishman, and more particularly of a Northumbrian, that if you scratch him he begins to brood over his institutions. And then from time to time he reforms them. He is, as it were, still in the atmosphere of those tremendous years before and after 1688, when our revolution was settled more by sincerity of argument than by force of arms, and when there were men of the calibre of Halifax the Trimmer to hold the balance. Now again in this century we are in the midst of another revolution, which is shown by our concern about our institutions. If we have neither the vigour, which is an affair of the spirit, nor the means, which is an affair of the intelligence, to reform our institutions, it will be a matter of interest mainly to the historians of the future; but such a state of affairs will be cold comfort to those of us who believe that the excellence of civilisation is shown in the capacity of its citizens constantly to reform its institutions in order to meet its changing cultural needs. But change may be for the better or the worse, and in remembering this we should be guided also by Burke's admonition, that "merely to innovate is not to reform."

To be an institution means many things, but on the whole the word has now a derogatory meaning. It conjures up pictures of buildings and committee rooms, of barracks and corridors, of orphanages and museums; and to call someone an "institutional child" is to speak half in pity and half in reproach. I will try to refresh the meaning of the word by reminding you that an institution is people and not things. An institution is the establishment and arrangement of human effort towards a common end. It will stand or fall according to the value of this end, or purpose as we may call it, and according to the means which are used to reach it. The means are the government, the administration, and the arrangement for carrying out its work—three quite separate functions which must not be confused. As the end never justifies the means, so these means or functions are all-important. By these standards most institutions neither stand nor fall, but just flounder along, because their end is forgotten, or because their means are confused or inept. You must forgive my presumption in placing these elementary thoughts in your minds before turning to the profession and practice of medicine which is now so involved in institutions that I must attempt to find a way through their maze.

Seeking definitions for the foundation of an argument like this, I go back to that early arch-Englishman Thomas Hobbes—who was "rare at definitions." In discussing how the liberty of subjects is to be measured, he stresses the overriding need for government, or sovereignty as he calls it, and distinguishes between Sovereignty by Acquisition, and Sovereignty by Institution. The former is to govern through the seizure of power; the latter is to govern by the covenant of one to another, or of the many to the few. This definition gives to the word institution the meaning I wish to convey. Institution is to covenant that something shall be carried out and to transmit to someone the authority to arrange for it to be carried out. I shall accept this

* The opening passages of the presidential address given by the late Sir James Spence to the Newcastle upon Tyne and Northern Counties Medical Society in October, 1953, followed by an outline of the rest of the lecture, prepared from Sir James's notes.

definition when I mention the institutions which affect medicine and the disorders which beset them.

I have indicated that institutions may be good or bad, or good in parts, or just floundering along. If they are bad there are usually three possible causes. These are (1) that they do not know or see clearly what they are trying to do—or there are conflicts of purpose in what they are trying to do; (2) that they have not the will to do what they know they should do (which is a fault of government); and (3) that they do not have the ways, and kind of people, to do what they want to do (which is a fault of arrangement or administration). Where arrangement or administration fails it is usually because there has been no clear definition of responsibility.

The simpler the institution, and the clearer its purpose, the easier it is for it to be successful. At one end of the scale we have simple institutions, like football teams, cricket clubs, ships' crews, and public schools, whose purposes are clear, and in which the division of responsibility is precise under arrangements which can be judged by results. At the other end of the scale we see complicated institutions like trade unions, professional associations, regional boards, trade corporations, national coal boards, and city councils. If they fail or flounder it is because their purpose is not clear or because their government and arrangement do not match their purpose.

[Here the lecturer spoke of the definitive distinction between a service and an institution.]

I can go no further in this attempt to anatomise human institutions, but before I look at the institutions which affect medicine I will recapitulate in mentioning three aspects of them which may be worth bearing in mind.

The first is the great increase in number and size of institutions in recent years. This carries the danger that we are creating institutions beyond the capacity of the available intelligence, the available will, and the available morality which are necessary to maintain them.

The second point, which arises from the first, is that the creation and maintenance of complicated institutions demand a particular kind of intelligence, personality, and education in those responsible for them. The form of this education took shape in John Locke's famous essay, and the substance of it was given in our older universities, at a time when they were designed to give an education for responsibility. This education was reinforced by a system in which the younger men knew intimately the older men experienced in the art of government. In the aristocratic tradition this was still further strengthened by the concept of *noblesse oblige*. If we were to seek modern examples of these mature craftsmen in the art of government of human institutions we could use John Anderson in our own day, and Robert Morant before him; but the weakness of our present situation is that it is impossible for a sufficient number of people to get close enough to men like Anderson and Morant to learn from their examples.

The third point concerns the manners of those who take part in the affairs of institutions: and by manners I mean *mores*, and therefore morality. It is beyond question that the manner, or morality, of most of us towards a simple institution like our family or our cricket club tends to be of a different order from that we adopt towards complicated and impersonal institutions like British Railways or the Commissioners of Income Tax. An appropriate morality is achieved satisfactorily in a good naval vessel, a good battalion, and a good university; but in the vast impersonal social institutions we are now creating the very opposite may happen. Perhaps our fate is that our civilisation will flounder in the midst of the vast institutions it builds, but which it cannot maintain, for want of capable men. They will then be like the dinosaurs—too big for their jobs, or too big for their shoes.

* * *

There was need, Sir James continued, for careful study of the defects and disorders of the many kinds of institutions affecting the profession and practices of medicine—for the study of *clinical institutology*, or the morbid anatomy of medical institutions.

Explaining what he meant by *medicine*, he described it as the fulfilment of a social contract or covenant between a professional man and another man who is sick or who fears he is sick. The fulfilment of this contract was in giving advice, explanation, or treatment, or any combination of these. The contract might be with a group of professional men, but in that case there was clear division of responsibility. Personal responsibility was the essence of medicine—the patient goes to a doctor not to a board of governors or a clinical cure company—and the doctor's first responsibility was to his patient not to his employer.

Types of Institution

Among the institutions affecting medicine two kinds of *professional association* could be distinguished: (*a*) those which are simply medical societies, and (*b*) those which have power over other people, such as the Royal Colleges with their diplomas and the specialist societies in America.

Of these the *medical societies* came first, for many reasons. Of all medical institutions they were the most moral—in purpose, in method of government, and in method of administration. They had frailties rather than disorders, and these were all in the officers rather than the members.

A third type of medical institution was *family practice*, whether by a group or by a single doctor. Fourth we might have the *health centre*—but not yet. He thought this would become a local service rather than an institution.

As an example of an institution nearly perfect in type, he described the working of the *Medical Research Council* and its National Institute of Medical Research.

Turning finally to the *hospitals*, he spoke of their development in four phases: first, the founding phase (round about 1750); secondly, the period when the hospital was the place of the predominant practitioner (1800–1900); thirdly, the period when it was the jumping-off ground for consultants—when practice was obtained through hospital reputation (1900–1930); and fourthly the period when it became a centre for specialist services, with development of peripheral specialist units.

Of hospital problems, the first was size: a hospital of up to 150–200 beds could be an institution, but above that size it was likely to become a service. In speaking of organisation, he recalled his definition of institution as the establishment and arrangement of human effort towards a common end, and said that he knew of no example of a good hospital which has not been created through the good offices and good will of its medical staff. Occasionally one might see a hospital which is very good but in which the medical staff appeared to play very little part in the government; but such a hospital functioned through the excellence of its component institutions. It was a fault if the medical staff either cannot or do not give guidance to the governing body.

The size and complexity of the large modern hospital made it a service rather than an institution, and much depended on the size of its constituent units. The size of the unit in turn depended on the proper size of the team in charge of it, which (he suggested) should not exceed 10–12.

The task of the teaching hospital was complicated by its additional responsibility for teaching and research;

and here Sir James Spence expressed his regret at the failure of the concept of the region with a university hospital at its centre. The position of the teaching hospital had become precarious through the growth of regional hospitals as specialist centres and through its consequent loss of acute medicine and surgery and the diseases about which general practitioners most need advice and help. In his opinion it had been a grave mistake not to make the teaching hospital a university institution, giving it a local area in which it would be responsible for designing the entire hospital service. It should be a central hospital for acute medicine, surgery, and fevers and with specialist annexes.

The University Pattern

Outlining the design of the teaching hospital—its methodology, its morality, its style—Sir James Spence drew a parallel with the English university at its best. Its three purposes—clinical science, clinical teaching, and the care of the sick—were comparable to the three purposes of a university, which are to advance scholarship, to teach students, and to create a university life; and there need be no conflict between these purposes. He believed that, just as universities are free from the control of the Ministry of Education, so teaching hospitals should be free from the control of the Ministry of Health.

In conclusion, he spoke of his faith in the future of our universities, through which England would endure. "They are big but they remain an institution." Conversely, he had great fears for the future of hospitals, and foresaw a day when the best of our young men will go into simpler and more satisfying institutions—notably general practice.

The Widdicombe File

XXI. MERE?

DEAR JAMES,

As young James no doubt will have told you by now, his job seems to be in the bag. There are the usual formalities to be gone through of course, but the old man likes the look of him, and I expect he'll be drawing his microscope from our store and booking his six feet of bench in a month or so.

There's a thing I want to talk to you about like a Dutch nephew though, James. Young James tells me—and indeed it can be read between the lines of your last letter to me—that you're not in the least proud that he's following in your footsteps. Which is a sad state of affairs, isn't it? But it's a symptom, you know, James, of a disease very widespread among pathologists—an excessive modesty about our own science. How many times have I not heard you get up at some society meeting, and begin in tones of abject apology, "Mr. Chairman, if a mere morbid anatomist might venture . . ." Mere morbid anatomist! What you had to say was always good sense, often much-needed good sense, and often as forward-looking as any of the speculations of airier sciences: but it was in your view mere morbid anatomy, to be heeded but not honoured. There are a few of the old generation of pathologists who believe in their subject, and a few of mine who think they've rediscovered it, but most of those who fruited between the wars wear a blighted air of eternally apologising for the smell of formalin.

There are two main reasons for this, one historical but ephemeral, the other psychological and perhaps inescapable. Historically we live still in the shadow of the let-down that followed the excessive pretensions of the German school. For well over a century, beginning with Morgagni, plain honest morbid anatomy was the master science of medicine. We need go no further than the classic works of Addison, Bright, and Paget to admit that. (Lord knows what one would call the master-science nowadays: the bacteriologists captured the fiery cross fairly from us somewhere about 1880, and the applied physiologists I suppose came next: but which of a score of contending disciplines one should recommend to the aspirant for fame I don't know: which I suppose is a healthy sign.) But not least of the diseases of western civilisation for which we can blame Mittel-Europa is the exploitation of morbid anatomy. Virchow was a very great man, second to none of our champions except Pasteur and perhaps Lister in their century. And Rokitansky and Cohnheim and Waldeyer and others were also mighty men in their generation. But they and their followers built up a fantastic machine which went on under its own steam long after its original inspiration had run down. Leaving Virchow himself on one side, the German-Austrian school made at the time rather less than their fair share of discoveries in pathology, but they wrote ten times as much about it. Who hasn't struggled with those terrible German articles of yesteryear (did Ewing really read all the references in his *Neoplastic Diseases*, I wonder?)—fifty pages of unsignposted text with two useless illustrations, ten of the pages devoted to cell-by-cell description and the rest to polemics, all based on perhaps one new fact that it's a day's work to locate. Even today, *Virchow's Archiv* . . . but that's another story. What wouldn't Matthew do to that so expensive journal!

By about 1890 the view that all good pathology was German was thoroughly fashionable, and for the next forty years all good pathologists went to Germany or Vienna to sit at the feet of one Herr Professor or the other. I have a vision of you, James, in your impressionable youth, standing among a cosmopolitan crowd of devotees ranged in two lines down the hall of Aschoff's Institut at Freiburg, while the Chief marched between the rows waving a bloody heart beneath your noses and drove into your avid minds an unalterable dogma. There was a long period when nine-tenths of the pathology in this country was secondhand German pathology. It's not surprising that in time the non-pathologists reacted rather violently. Morbid anatomy isn't all of medicine, morbid anatomy for its own sake is only quite a small part of medicine. When the Bayliss-Mellanby-Lewis school of physiological medicine attacked (the Eumenides come to punish our *hubris*) we crumpled badly. Much of their more virulent darts were mere Sir Tommy-rot; but still we crumpled, and to be a "mere morbid anatomist" has been a term of derision ever since.

That's mere temporary insanity: we are already past bottom dead centre and on the way up again. But there is one disability under which pathologists labour and always will. We are all shy men. Granted many of us overcompensate and behave with excessive heartiness or are even aggressively rude, it is still true that at bottom we are shy. Let me expound. The satisfaction derived from the practice of medicine by its best practitioners resides chiefly in the employment of a highly personal intellectual skill for the immediate uncomplicated benefit of their fellow men. It is possible to feel to the full this generous fervour, and yet to find that, faced with the individual patient, one loves him less than one should: and this is often due, not to misanthropy, but to a simple failure of the capacity, more born than made, for the establishment of that instant rapport with other men which is so essential to the successful clinician. I do not think we should be ashamed of admitting that in this sense most pathologists are clinicians *manqués*. In one way or another, from those who have frothed up into the cloud-cuckoo-land of psychiatry to those who have withdrawn into the surgery of one organ, from pure researchers and statisticians to editors and members of

Parliament, many of the brightest ornaments of our profession are refugees from the clinical front line. But the isolation of the laboratory tends to exaggerate the primary defect, and pathologists do on the whole seem even to themselves to be a rather ungracious lot compared to many of our colleagues. But the fault, dear Jacobus, lies not in our science but in ourselves, that we are unglamorous. Let us not therefore repine, and grovel, and look hangdog. Glamour of a sort is necessary to the clinician: to the pathologist (unless indeed he teaches undergraduates, when it will help him for the first week or two of term, till they find him out) glamour is as incongruous and unnecessary as an orchid buttonhole on a coal-heaver.

There's something to be said for every branch of the work we do. Even post mortems. It's a mucky job, and hard work, and few normal people I think really relish its actual doing—and fewer still find it easy to confess to their fiancées or their children just how they earn that part of their living. But post mortems can be infinitely exciting: real life is always better than the best detective novel.

> "World is suddener than we fancy it
> World is crazier and more of it than we think
> Incorrigibly plural."

—there are few better illustrations of Macneice's dictum than that ever-surprising four-dimensional puzzle presented by the body at the end of a lifetime of varied assaults and defences: and few satisfactions greater than that of making the pieces fit. And the job is vital enough: the P.-M. room is almost the only independent conscience left to a hospital nowadays. A hospital whose consultants never see a post mortem has a rottenness at its core: and it is often the pathologist's fault if they don't. (What a knife edge must we often walk between the carping Charybdis of the cheap jeer at a wrong clinical diagnosis, and the soothing Scylla of the "my colleague, right or wrong" attitude—but how worth while it is to find it.)

Important though post mortems are, the whole orientation of most pathological departments has been altered in the last twenty years by the steady rise of biopsy work. Histopathology used to be chiefly the art of telling the surgeon what kind of lump he had taken out—an esoteric affair of limited practical importance, with few skilled practitioners. The tremendous increase in the use of the biopsy as a means of diagnosis—by physicians even more than surgeons—has profoundly altered this. We have far more work, and what there is is a great deal more interesting and valuable. Our relation to our hospital is becoming curiously similar to the radiologist's. He sees more patients, and sees them sometimes in motion: we see a little deeper, and on the whole our diagnoses are more reliable: but we get more and more like each other, and what might be called our public-relations and administrative problems are very much his. What a game histopathology is!—one of the most difficult arts of medicine, wearisome without end to learn, exasperating to the end, yet ever and again with its rewards of sudden illumination.

That's all very well, you may say, James; the routine's valuable and very much more interesting than it looks, but how about research? Nowadays you can't hit the headlines without estimating the lacrimal excretion of radio-ytterbium-labelled preposterol, or inventing a five-dimensional tensor-vector E.E.G., or growing the virus of onychogryphosis in crocodile's eggs. How can I convince people that research in straight pathology is worth while? Simply enough. The answer is, just as Vesalius had to come before Harvey, morphological research has always to precede physiological: but the second stage of this process is always the more spectacular of the two—simply because it scoops the pool provided by its predecessor. There's a singularly apt parable provided by the reputations of those two great American cardiologists, Maude Abbott and Helen Taussig. Maude Abbott worked forty years on congenital hearts, and produced an Atlas which everyone has heard of though few read. Helen Taussig sorted out what the anomalies Maude Abbott had described meant in terms of function, and she and Blalock scooped a sensational pool. It was wonderful work: don't imagine for a moment I abate anything in admiration of it, but don't take Maude Abbott for granted. Without the anatomical grounding it couldn't have been done.

If the surgery of congenital hearts had never been invented, Maude Abbott's Atlas would hardly have been heard of outside her specialised field. The same applies to all exploratory, observational, recording research. One can never know what part of the field is going to be illuminated suddenly by the searchlight of practical application. An observational research is never wholly done. No barber shaves so close but another finds work: and moreover observations are like translations from the Greek, and need to be done afresh for every generation. Whoever believes that there is no more worth-while research to be done in morbid anatomy is either a fool or blind. We make discoveries slowly, but they stick. This business of Barr's about sexing nuclei—what an object-lesson it is in the way things can stare us in the face for years without ever being seen! How many other things must we be looking at every day without seeing them? Morbid anatomy was dead, they said, in the early '30s: but the Kimmelstiel-Wilson kidney and the diabetic retina, the pathology of crush kidney, virus hepatitis, retrolental fibroplasia, and molluscum sebaceum are all stories which have broken since then, and in that list I have included only a few common important things. We progress, slowly perhaps, but genuinely: and if we cease to progress the whole edifice of physiological research will go on without noticing it much for ten or twenty years, and then lose itself in a maze of theories that have lost that feet-on-the-earth check which we supply better than anyone else can.

We accept too easily the idea that observational research and the experimental method are two different things. (I see it is fashionable nowadays to ascribe the invention of the experimental method to Grosseteste, Bishop of Lincoln: perhaps I shall protest less when next Peter junior calls me "big-head.") An experiment is not something you do with spectrometers or guineapigs or Geiger counters: if you are merely amassing data, you may use ten isotopes and a thousand mice without doing, truly, an experiment. If you make a hypothesis based on evidence, and then set about collecting new data to test that hypothesis and abide honestly by the result, you are acting in the best experimental tradition, even if your new data are acquired by mere inspection of organs or microscopical slides or even the library. It is the attitude of mind, not the technique, that matters.

Which is not to decry technically experimental research. (Our mice have got ectromelia again, though, which would give me an excuse for any amount of decrying.) But that is open to all men, even though it may still call itself pathology. I am speaking only of the kind of research that is inherent in the activities of those who call themselves pathologists on hospital staffs: and I think it's good and necessary.

I've lectured you long enough. Don't let me puff you up with false pride, James. Stay humble, but be humble rather before the infinite complexity of man's body than before the pretensions of other disciplines. Let your model be Jeanie Deans rather than Uriah Heep. We will do our best to keep young James proud of being a pathologist.

Yours,
PETER DAVEY.

In England Now

A Running Commentary by Peripatetic Correspondents

MOST doctors wisely refrain from giving medical advice on second-hand information about symptoms, but I have lately had two vicarious patients whose progress suggests that advice based on vague information is sometimes worth acting on.

The first was a middle-aged man who developed mysterious falling attacks with loss of consciousness. These caused grave concern, many serious possibilities were discussed, and phenobarbitone was prescribed. A letter from his wife, read out at my breakfast table, gave a perfect description of cough syncope. A recent paper on this subject was therefore sent to the patient's doctor, and no more was heard of these attacks.

I heard of the second patient when an English doctor sent me a letter she had received about a relative in America who was becoming mentally disturbed and was being treated for hysteria. A letter written by the patient herself showed, among other evidence, unmistakable evidence of dysgraphia. I wrote to the English doctor suggesting that a left hemisphere cerebral tumour was likely, and that a good brain surgeon should be consulted without delay. This advice duly crossed the Atlantic, and was acted on with remarkable speed despite considerable resistance from the patient's advisers. Two and a half weeks after the first letter was written a cable was received in England: "Successful removal benign brain tumour, size of egg." Apparently the patient was critically ill at the time of operation and a malignant tumour seemed likely, but at operation a large meningioma was easily removed from the surface of the brain, and complete recovery followed.

In medical work it is sometimes the simplest acts which are of most consequence, while some of our present-day complex procedures too often pay insignificant dividends.

* * *

Opinions vary on the usefulness of oral penicillins; and hospital doctors, who can inject penicillin in a few seconds with the aid of nothing more strenuous than a fountain-pen, see the problem a little differently from their friends in general practice.

Last week I prescribed oral penicillin for a small boy with bronchitis. I was horrified to find later in the day that the medicine had proved so much to his liking that he had taken the whole bottle-full at a single dose. Appalling thoughts of overdosage, poisoning, and stomach washouts passed through my mind. After ordering an ambulance, I rang the local hospital to warn them of the impending arrival. The house-physician, on hearing that 12 million units of penicillin had been swallowed by a boy of seven, gave it as his opinion that that "was no earthly good—I should *inject* a million units straightaway."

* * *

I took Justin, our young anæsthetist, down to the end of the jetty and we began to prepare our lines. The golden grey mullet were moving darkly in the black-green waters below and I hoped for a good catch. Everything seemed right—the sea was fairly calm, the wind low and southerly, the sky flecked with high cloud: everything seemed right—that is, except Justin, who has a natural genius for getting into trouble. He seems to live on the brink of chaos and is always more than half inclined to fall into the abyss. On our last fishing expedition—the Hospital Anglers' Outing—he had walked quietly and with infinite dignity off the edge of the weir into the river and emerged many minutes later, when the rest of us had abandoned hope, more than 100 yards downstream with his pipe still clenched between his teeth and his net and rod in his hands. To the immense edification of the party he picked his way out of the water, attached a new fly to his line, and walked back along the weir to the exact spot from which he had fallen; he then cast with consummate grace and skill across the tail of the fish-run as though nothing had happened. There is always an impeccable aristocracy about Justin's behaviour, of which no-one is more keenly conscious than himself.

Standing on the jetty behind us was a young visitor from London immaculately over-dressed in the mock-Edwardian style of the day. He smiled indulgently as Justin was trying to restore order to his line. Justin scowled. I was about to drop my live bait into the sea when a cormorant, attracted by the fish, suddenly swept up from the waves and alighted on the railing between Justin and me. In a last despairing effort to unravel his line and sinker Justin was swinging it round his head in ever-increasing circles. The line went spiralling round the cormorant's neck and in a moment the bird was captured. I was too amazed to speak. The Edwardian, deeply impressed, had lost his smile. "Cor blimey!" he gasped, "Is that the usual way to catch 'em?"

Justin, who appeared unmoved, looked slowly all the way down his long patrician nose. "And pray," he said, "what method would *you* use?"

* * *

Beer may be best at home, but as all the world knows Americans like soft drinks. The reason for their addiction to 'Coca-Cola' is obscure. Possibly the secret lies in the fact that each bottle contains about $2^1/_2$ grains of caffeine. Whatever the reason coke machines are to be found everywhere—in canteens, shops, factories, out-patient departments, hospital corridors, outside operating-theatres, and even in post-offices. They are of ingenious design. Insert your coin and down comes a refrigerated bottle and your change. An opener is handy, and a crate rack for empties stands at the side of the machine. At medical conferences the manufacturers supply the stuff free and in unlimited quantities. They deserve their ultimate dividend for this contribution to the prevention of sleep and dehydration.

* * *

Few doctors can put their hand on their heart and say "I have never given myself drugs," but many can say, with Sir Joseph Porter, "Hardly ever." Aspirin once in two years for a headache, and an occasional barbiturate for sleeplessness is my normal indulgence, but last week two nights' poor and disturbed sleep had lowered my morale and a day's hard work strengthened my determination to have a really good night. So at 19.30 (I always use the 24-hour clock), immediately before supper, I took two capsules from one of my boxes of samples. All was well until I was about to tackle some apple-pie with cream (the Queen of my puddings) when my wife noticing my vacant expression accused me of being drunk. I had enough sense to tell her of my misdemeanour. After some unjustifiable resistance and supported on both sides I was led to bed muttering as I went that I must send the firm a testimonial. I was undressed and fell into bed and a sound sleep, disturbed soon after by the visit of my doctor, who comforted my family and gave me a good prognosis. He was fully justified, for the next day I did my daily round and tasks. By a curious coincidence a friend from abroad came to stay. She had not recovered from a severe operation and asked if I could prescribe something for her insomnia. With what rapture I presented her with the remnants of my sample.

* * *

Enthusiastic junior staff sometimes lack the verbal discretion of their more mature colleagues. Our surgical registrar and his house-surgeon lately had occasion to write up their separate sections on a form for cremation, and it had been agreed that the H.S. would collect dues from the undertaker. Later he breezed into the casualty-room and, with no heed to a crowd of attentive patients, cried: "Cremation form—here's your two guineas." With commendable presence of mind the S.R. said: "Ah yes thank you—just managed to scrape in third I gather—a good race." A financial transaction that might well have caused misgiving among the bystanders was given the versimilitude of one which no-one present would do other than approve.

* * *

"I always know what to give a lady," said my bus conductor (not to me, unfortunately). "First I give her a Guinness and then I give her a gin-and-cloves—a lovely drink for a lady—and then I give her a good strong port."

Letters to the Editor

USE AND ABUSE OF ANTIBIOTICS

SIR,—I fear your correspondents of Dec. 18, Mr. Grainger and Mr. Elliott, have been misled by the necessarily brief account which you gave of my remarks at the conclusion of the joint meeting of the sections of general practice and medicine at the Royal Society of Medicine. You report that I had been "struck by the fact that 50% of the drug bill of every large hospital was for penicillin." We were discussing antibiotics, and I was referring not to the total cost of drugs, but to the expenditure on antibiotics, and stressing that despite the criticisms which had been levelled against penicillin, it remained the most widely used of these drugs. On the last available figures, every large hospital in my own region (which I had no reason to doubt reflected the general picture) was spending approximately 50% of its total antibiotic costs on penicillin despite its decrease in price, and the advent of newer antibiotics. Precise figures for the whole region and for the United Liverpool Hospitals are as follows:

Liverpool Regional Hospital Board

Year	*Antibiotic cost (% of total drug cost)*	*Penicillin*	*Streptomycin*	*Chloramphenicol*	*Aureomycin*	*Other antibiotics*
1950–51	29%	67%	33%	—	—	—
1951–52	40%	51%	49%	—	—	—
1952–53	40%	48%	30%	13%	9%	—
*1953–54	36·2%	41%	29%	10%	11%	9%
The United Liverpool (Teaching) Hospitals						
1952–53	32·9%	61%	12%	18%	9%	0·3%
*1953–54	30·1%	57%	11%	12%	12%	8%

* The returns of 1953–54 have become available since the symposium and show a small fall in the cost of penicillin.

My plea for discrimination in the use of especially the newer antibiotics was not based primarily on economy, but on their potential hazards both to the individual and to the community.

Liverpool. HENRY COHEN.

PSYCHOLOGICAL ASPECTS OF UTERINE DYSFUNCTION

SIR,—In his article of Dec. 18 Dr. Cramond concludes that "psychiatric methods of prediction and prevention in the antenatal period would have no effect on the occurrence of uterine dysfunction." While this may well be true of the psycho-analytical approach it is not a logical deduction from his paper, nor is he entitled to conclude that "fear, emotion, and anxiety play no part in the outcome of labour from the practical obstetrical point of view." Neither his control nor his "dysfunction" group were given any sort of physical or psychological preparation unless we count the eighteen who attended "talks on pregnancy and childbirth." There remains a possibility therefore that uterine function in both groups might have been improved by good preparation and that some of the "dysfunction" group might have avoided their forceps and sections.

The fashionable rejection of preparation for childbirth is too often based on slender grounds, the preparation having consisted solely of a few "relaxation" classes and a lecture or two. Numerous workers have found a more thorough preparation of value. Dick Read, while one can dispute his physiology, undoubtedly influenced the course of labour in his patients.

In France workers at the maternity clinic of the Pierre Roques polyclinic, basing their work on Pavlov's theories of central nervous physiology (perhaps Dr. Cramond will find these equally obnoxious), are also demonstrating the very real influence of what they call "psycho-prophylaxis" on labour. Their methods include: (*a*) explanation of the facts of pregnancy and labour; (*b*) explanation of the rôle of tradition and false attitudes in lowering the cortical threshold to pain by implanting false conditioned reflexes; (*c*) an attempt to replace these false attitudes with healthy ones; and (*d*) instructions in methods of muscular relaxation and respiration. Finally, great stress is laid on a factor usually neglected in this country—the need for the constant presence throughout labour of trained staff to assist the parturient woman in the application of her lessons. By these methods some 80% of obstetrically normal mothers are delivered without the use of analgesics. The average duration of labour has diminished and the intervention rate has dropped sharply in this clinic since the introduction of these methods.[1,2]

Dr. Cramond concedes that preparation may alleviate "mental pain," however this is defined. I feel there is evidence that it can do more than this. One does not dispute the multiple ætiology of uterine dysfunction in claiming that preparation for childbirth can remove, in some women, one cause for it. In addition preparation can provide for the majority of women having normal deliveries an experience always tolerable and often enjoyed.

London, N.W.5. ANTHONY RYLE.

HARDENED FATS AND LUNG CANCER

SIR,—Dr. Nyrop's suggestion (Dec. 18) that the consumption of margarine may be a factor in the causation of lung cancer is based on such slender, irrelevant, and sometimes inaccurate arguments that it must be challenged.

His first point is that the unsaturated essential fatty acids may play a part in protecting the body against carcinogenic agents. The only real evidence which Dr. Nyrop quotes for this is the work of Deuel et al.,[3] in which rats deficient in these substances were found to succumb rather sooner to carcinogenic doses of X rays. How they react to chemical carcinogens is quite unknown. More important, deficiency of essential fatty acids has never been shown definitely to occur in man.

Secondly, Dr. Nyrop states that the hydrogenation of fats to produce margarine and shortenings "almost eliminates essential acids." This is not true. Margarine contains something like twice as much essential fatty acids as butter, and shortenings may contain up to four times as much as butter.[4] Rats have been reared for 25 generations (equivalent in man to some 750 years) on margarine as the source of dietary fat, and have shown as good health, vitality, growth, longevity, and fertility as those fed on butter.[5]

Finally, Dr. Nyrop falls into the common trap of "correlation equals causation." Margarine consumption has increased, so has cancer of the lung; ergo, the former causes the latter. But it is not only the consumption of margarine which has increased; there has also been an increase in looking into television and in the use of synthetic fibres for clothing, either of which could equally well be accused of causing bronchial carcinoma. The argument could be used just as reasonably to prove the *lack* of association between consumption of margarine and the incidence of cancer of the lung. In countries where there has been little or no rationing, the average consumption of margarine is inversely proportional to income; we should therefore expect a similar relationship between cancer of the lung and economic class. In fact, the relationship between lung cancer and economic class is slight and its direction differs in men and women; in any event, it does not fit in with Dr. Nyrop's hypothesis. Again, margarine consumption in Holland is

1. Ryle, A. *Med. World, Lond.* 1954, **80**, 36.
2. *Rev. nour. Med.* 1954, no. 3 (special issue).
3. Deuel, H. J., Chang, A. L. S., Kryder, G. D., Bingemann, M. E. *Science*, 1953, **117**, 254.
4. Deuel, H. J. Greenberg, S. M., Anisfoeld, L., Melnick, D. *J. Nutr.* 1951, **45**, 535.
5. Deuel, H. J., Greenberg, S. M., Savage, E. E. *Ibid*, 1950, **42**, 239.

appreciably higher than in Britain but the incidence of lung cancer is approximately half that in Britain.

Summarising then, we may say: (1) whilst there is some evidence that deficiency of essential fatty acids renders animals more susceptible to X-ray cancer, there is no evidence that they are more susceptible to chemical carcinogens; (2) deficiency of essential fatty acids rarely if ever occurs in man; (3) hydrogenated fats like margarine contain more of these acids than the fats, such as butter, which they replace in the diet; and (4) the incidence of cancer of the lung is not generally higher in those groups with higher margarine consumption

Queen Elizabeth College,
London, W.8. JOHN YUDKIN.

OCCASIONAL BRONCHOGRAPHY

SIR,—I was interested to read Dr. Glendinning's article in your issue of Dec. 18. The method he describes I have used essentially unchanged except as regards the actual local anæsthetic for the past sixteen years or so, with complete satisfaction in very many more patients than "the occasional case."

Atropine injected a half to one hour before the examination commences is invaluable and I do not hesitate to increase the dose from gr. $^1/_{100}$ to $^1/_{75}$, or even gr. $^1/_{50}$, in the chronic bronchitic, whose mucous membranes are generally much more moist than those of the average person.

As a recent refinement I find that a tablet of amethocaine (gr.$^1/_2$) given to suck a few minutes before the spraying begins gets over the "gagging" of the sensitive or nervous patient who resents the approach of a throat spray. Incidentally, I find 2% plain lignocaine ('Xylocaine') quite adequate (which increases the safety margin still further), and by using a De Vilbiss syringe can get my spraying direct on to the cords. After intubation in the chronic bronchitic I inject 1 ml. of the lignocaine solution down the tube a minute or so before following it with the opaque medium.

There are a few patients who have the knack of saying "e" quite well with a small catheter between their vocal cords, and I find the simple trick of aspirating air up the catheter confirms the correct lie of the tube. If the tube is in the trachea aspiration is of course easy and completely devoid of resistance and injection is equally effortless; with the tube in the œsophagus aspiration of air is either impossible or intermittently possible against a feeling of resistance.

The virtue of the method Dr. Glendinning has described is that in the hands of the tyro the worst that can happen is a failure of the examination, and with reasonable care a satisfactory examination is carried out with little distress to the patient. In the hands of the expert it gives an opportunity for detailed filling of any area or areas without hurry and, if necessary, under screen control.

Central Middlesex Hospital,
London, N.W.10. F. PYGOTT.

SIR,—Dr. Glendinning provides a valuable description of a very pretty bronchographic method and suggests that patients would much prefer tracheal intubation to cricothyroid puncture. I have used a similar method of transnasal blind intubation for some years and although I agree it is free from the dangers of cricothyroid puncture, patients who have been subjected to both methods say without exception they much preferred the cricothyroid route. Dr. Glendinning does not mention the difficulty I have sometimes found in passing the tube through the conscious patient's nose and in making it curl down into the pharynx. Questioning patients and practice on myself suggests that this is the most uncomfortable part of the procedure.

King's College Hospital,
London, S.E.5. FRANK RACKOW.

A FILM ON MENTAL NURSING

SIR,—I read in your issue of Dec. 18 the report of the film *The Troubled Mind*, and looked forward to seeing it on the television programme that night. Having seen it, I find my mind very troubled.

The object in producing this film was to show it to the general public in order to attract recruits to mental nursing. Surely sight must have been lost of the effect this film will have, not only on the parents of recruits, but also on patients who may require treatment in mental hospitals, and their relatives.

For many years now, a great deal of time has been spent, and much work has been done, in enlightening the general public on mental illness, and encouraging the mentally ill to come voluntarily into hospital for treatment. That this effort has been justified is shown by the fact that between 70% and 80% of patients now come in voluntarily, some hospitals claiming an even higher percentage of voluntary admissions.

The general public, the relatives of the mentally ill, and the sick patients themselves nearly always conceive the mental hospital as being populated by patients obviously deranged, obviously disturbed, and obviously requiring segregation. The fear of entering a mental hospital is so often based on this conception that admission is refused on the grounds that the illness is not bad enough or will become worse as a result of mixing with such patients.

This film, in my opinion, serves only to confirm these misconceptions, and I now fear the results. It is obvious that patients could not be used in the film, but the rôles played by the members of the staff of Shenley to depict patients were poorly portrayed and grossly over-acted. If patients themselves could have been filmed, I am sure that they would have appeared more normal and that even the scene showing the disturbed ward would not have included (in any one day) all the deranged behaviour shown. In the incident of the male patient refusing occupational therapy, was it necessary to indulge in facial twitching in order to be recognised as a patient?

Hysterical attempts at suicide, impulsive smashing of windows, furious digging in the gardens, deliberate destruction of shrubs were all shown as the common everyday behaviour, all manifest at practically the same time, and even those patients walking in the grounds of the hospital were openly "mental." Except for the scene of the small group in the room saying they had come voluntarily, on whom only a few moments were spent, there was no suggestion of the normality of which, as you rightly point out, newcomers to mental hospitals remark, "But these are normal people."

Why must electroconvulsion therapy be shown as distressing to the new nurse when modern treatment using muscle relaxants routinely produces practically no visible signs of convulsion? Why must occupational therapy be represented by cane work? In a fairly recent comedy film, the hero is shown doing cane work to infer his admission to a mental-observation ward, much to the amusement of the audience.

More student mental nurses are very sorely needed. They are required to be trained to nurse the mentally ill, and to help in the treatment of the acute cases and in the nursing and rehabilitation of the many long-stay patients who for lack of sufficient staff, tend to be withdrawn, idle, slovenly, and incontinent. Nurses are required in larger numbers, so that each can have a small group of patients for stimulating interests, for encouraging habit training, for occupational and recreational therapy, for nursing the physically ill, and for encouraging the aged to be ambulant. The concern for patients must continue to be fostered, and not, as in the film, trained into apparent indifference as shown by the ward sister towards the suicide attempt.

I doubt very much the value of this film in recruitment. The film is courageous but it does not show the training and work of a mental nurse in true perspective. It does harm in placing before the public a picture of mental hospitals which is not in accord with conditions today. I fear it may only indirectly help to solve the problem of the shortage of nurses in mental hospitals—that is, by discouraging from voluntary admission a large number of patients in need of treatment.

Bexley Hospital, Kent. M. RADZAN.

A WORD WANTED

SIR,—May I, with some diffidence, point out that, in his letter in your issue of Dec. 18, Dr. Todd is in error. The meaning he ascribes to πρός is in fact that of πρό and it is from this word that πρωΐ is derived.

There already exists an excellent Greek word, πρόσκοπος ("seeing beforehand"), the English form of which would be "proscopic." Since the true superlative of πρό is πρῶτος (first), an alternative and more emphatic adjective would be 'protoscopic.'

DOCTOR'S HUSBAND.

PATIENTS' DAMAGES

SIR,—Most of your readers will agree that the great majority of cases of medical negligence in which no special clinical or pathological knowledge is required can be effectively and fairly dealt with under the present system. It is in the vitally important minority of cases where such knowledge is essential that the courts are placed in the invidious and impossible position of having to assess clinical judgment in retrospect. The remarkable change in legal interpretation as a result of the 1946 Act seems to result in pronouncements which, as I pointed out in my original letter (Oct. 30), often seem to be inspired by the view that this legislation guarantees the patient not only treatment but cure.

I was at no time enamoured of the idea of taking medicine outside the law: my concern was wholly—and not at all incidentally—with the ethical sequelæ of this change in judicial interpretation, and it was solely for the safeguarding of these principles that medical representation was advocated in the investigation of such negligence. Legal convenience was not my concern, but a leading article in the *Times* of Dec. 18, while not concerned with professional freedom, does suggest an arrangement by which both medical and legal interests might properly be served:

> "Administrative tribunals, whose decisions are enforceable as law, have no doubt come to stay. They do, as a rule, dispense fair judgments—comparatively cheaply—over a great range of subjects on which the Queen's judges have, and would claim, little competence to pronounce. The need for them arises from the overruling by legislation of private rights, generally property rights but sometimes rights of personal liberty, for the sake of public advantage."

It is ironical to note that the letter instigating this exposition was concerned not with advocating the establishment of such tribunals, but that there should be easier appeals from their decisions. Medicine is thus not one but two steps in arrears!

This brings the argument full cycle. The problem remains, but it is only fogged to those of us who are good administrators or indifferent doctors. The evolutions of both medicine and the common law, possibly through regard for each others' special function, have traditionally been in parallel, and the results have dovetailed for the welfare and well-being of the community. But now they are to some extent in collision, and there may be many of your readers who are concerned that the standard medical contribution to medicolegal controversy seems too often to be that of gratuitous apology which, rightly or wrongly, presents the picture of a profession in flight from its principles, and content to accept the clinical intuition of Her Majesty's judiciary.

Royal South Hants Hospital, Southampton. P. FARNAN.

TUBERCULOSIS IN IMMIGRANTS

SIR,—I should like to endorse most strongly the opinion of Dr. Sevitt (Dec. 18) that the solution to the problem of how to protect the health of the Irish immigrant lies in close and friendly coöperation between the British and Irish health authorities. Attempts at compulsion are unnecessary and probably inapplicable; moreover, they are likely to arouse strong resentment and so befog the real issues. I can see no clash of interest whatever between the Irish and ourselves over this matter; it is in their interest that their subjects over here remain well and in ours to keep them well. Let us thrash out our mutual difficulties amicably, sensibly—and together.

Clare Hall Hospital, Barnet. NORMAN MACDONALD.

TRYPSIN INHALATION IN BRONCHITIS

SIR,—I was very interested to read the letter from Dr. Oswald and his colleagues in your issue of Dec. 4.

I do not think that trypsin has a place in the treatment of the ambulant chronic bronchitic, but, if effective, it would have a very definite place in the treatment of the acutely ill emphysematous patient who is unable to raise sputum because of its tenacity. It would also help in the management of the emphysematous patient who, having got over his acute respiratory infection, becomes chronically anoxic simply because he cannot get rid of the tenacious sputum. Chronic anoxia results in more and more lethargy and inability to concentrate and hence less desire to cough. In fact the mental state may be such that the patient is thought to be just "plain awkward."

Exsufflation with negative pressure[1] is used in the U.S.A. in the treatment of these patients, as is intermittent positive-pressure breathing,[2] which also helps to get the aerosol deeply into the lungs. Both methods require the coöperation of the patient, and they are costly and, so far as I know, unavailable in this country.

I have used 'Trypure' in a patient aged 57 who was admitted on Oct. 14 in semicoma due to an acute respiratory infection complicating a severe degree of emphysema. His wife said that he always had difficulty in raising sputum. On admission arterial blood analysis showed a pH of 7·25, a pCO_2 of 69 mm., and an oxygen saturation of 49%. One month later the oxygen saturation had risen to 71%, the pH was 7·33, and the pCO_2 56·3 mm. At this point, although cyanosed, he was mentally clear.

Since then his cyanosis has increased, owing, I think, to his inability to get rid of the sputum, and his mental state has deteriorated. Arterial blood analysis now shows a pH of 7·30, a pCO_2 of 62·5 mm., and an oxygen saturation of 45%. Although the pCO_2 in repeated blood analyses has shown a tendency to rise slightly the oxygen saturation has remained almost constant. He will not tolerate oxygen therapy. Trypure has been used, therefore, to loosen his sputum. It has been given through a Collison inhaler using 8·3 mg. in 2·5 ml. of the buffer on the first, double the amount of both on the second, and three times the amount on the third day. This dosage was used in order to avoid waste since trypure is supplied in 50-mg. phials with 15 ml. of diluent and when mixed must be used at once. On the following day I divided the 50 mg. into three equal parts and gave three inhalations at 4-hourly intervals.

Although there was no immediate improvement in his general condition he has raised more sputum on these and subsequent days, and 5 days later his mental condition became quite clear and the arterial blood showed a pH of 7·29, a pCO_2 of 60 mm., and an oxygen saturation of 60%. Whether this improvement will be maintained or not I do not know, but all the evidence suggests that it is due to the action of

1. Barach, A. L., Beck, G. J. *Arch. intern. Med.* 1954, **93**, 825. Beck, G. J., Barach, A. L., Smith, W. H. *Mod. Hosp.* January, 1954.
2. Motley, H. L. *Bull. N.Y. Acad. Med.* 1950, **26**, 479.

trypure in loosening the sputum. If I had had the complete coöperation of this patient or a more effective method of getting the trypure into the depths of the lungs a better result might have been obtained.

I would suggest that an assessment of the value of trypure be made not on the ambulant bronchitic whose sputum varies in character and amount from day to day, but on those who are either acutely ill or chronically anoxic because of the inability to get rid of tenacious sputum.

My thanks are due to Evans Medical Supplies Ltd. for the supply of 'Trypure.'

Chase Farm Hospital, Enfield, Middlesex. THOMAS SIMPSON.

LONG-TERM CHEMOTHERAPY OF TUBERCULOSIS

SIR,—We were interested in Dr. Mitchell's comments (Nov. 13) on our article of Oct. 2. We hope to publish shortly the results of one year's treatment in the two groups of patients whom we have investigated, and there to deal in greater detail with the important problem of previous chemotherapy.

C. L. JOINER
J. D. CARROLL
ROBERT KNOX
K. S. MACLEAN.

Guy's Hospital, London, S.E.1.

CONTINUOUS INTRAVENOUS OXYTOCIN

SIR,—The article by Mr. Holmes in your issue of Dec. 11 is of great interest to those attending women in labour.

At the obstetric clinic of the University of Geneva,[1] similar experiments were carried out in 1949 on 91 cases, and the conclusions reached were comparable to those of Mr. Holmes. It was felt, however, that a 5% glucose solution was to be preferred to physiological saline for the following reasons:

(*a*) The heavy demand made upon the uterine muscle during labour, especially after oxytocin administration, requires an increased intake of glucose. An intravenous drip is indicated especially in cases where feeding by mouth is being withheld in view of possible anæsthetics.

(*b*) Oxytocin increases liver glycogenolysis. The hepatic glycogen reserve may be considerably lowered, and it is therefore advisable to replace the loss by additional intake of glucose.

In no case was venous thrombosis observed.

The Marie Curie Hospital, London, N.W.3. RACHEL WERBLOWSKY.

RASH ON THE SOFT PALATE

SIR,—I was struck by an illustration, in Dr. Holzel's article of Nov. 20, of a soft-palate rash, and I said at once "Alexander's sign." In early 1919 there appeared in the bulletin of current medical literature issued to the R.A.M.C. a précis of an article by a Russian physician, Alexander, who described a soft-palate rash as a diagnostic sign of true influenza. This rash he affirmed to be on the soft palate and to be punctate and erythematous with some œdema which outlined the junction with the hard palate. It was unlike that noted in infective mononucleosis in being rarely petechial.

As we were in the middle of an outbreak of true influenza at that time, I was soon able to convince myself that the rash always did occur in the first few days of true influenza and that it did not occur in the common forms of febrile rhinitis, &c., which are commonly called influenza.

Since that time I have found that this rash is of great help in the differential diagnosis of true virus influenza. But I have never heard of any other physician who was acquainted with it.

Bitton, near Bristol. A. T. TODD.

1. Werblowsky, R. University of Geneva, thesis no. 1965, 1950.

MASS TUBERCULIN TESTING

SIR,—In your otherwise admirable leader of Dec. 18, I was alarmed to see the re-birth of an old idea that mass miniature radiography units should be diverted to mass tuberculin testing—a course which can only lead to a reduction in the total output of these valuable units at a time when more and not less chest radiography needs to be done. Probably less than 30% of our adult population have ever had an X-ray examination of their chests and one of the problems before mass radiography is to include in its scope those not previously X-rayed. Ideally this would be the whole of the remaining 70% but with the limited resources available it is to be expected that only selected groups can be surveyed. In my view this can now be achieved only by an intensive and nation-wide propaganda campaign on a scale at least as powerful as that devoted to diphtheria immunisation or the sale of detergents. It is a practical fact that the limits of local propaganda have been reached.

The essential element of mass radiography which distinguishes it from other forms of chest radiography is the speed at which the film passes the shutter of the camera. Nothing must be allowed to slow this speed. Although the staff of the present units have considerable experience in approaching the public and in the organisation of mass campaigns, their function is in no other way connected with tuberculin testing and the two should not be confused. Thus, though there might be some virtue in a loose association between a tuberculin-testing team and a M.M.R. unit in order to pool certain resources and experience, any attempt to fuse the two would be to the advantage of neither and the detriment of both.

The level of tuberculin positivity is still high enough in the adult population to merit mass X-ray examination without previous tuberculin testing and although it is often claimed that the discovery of a positive tuberculin reactor leads to the discovery of a source case, it is equally often forgotten that the discovery of a case by M.M.R. also leads to another one by proper surveillance of contacts. Mass radiography has a vast task still to do; let it not be diverted to other pursuits till that task is finished.

One further point. If mass tuberculin testing is to be done, then the sooner the better, and before the scene becomes shrouded in the mists of tuberculin positivity created by B.C.G.

London, W.1. F. D. BEDDARD.

SIR,—In your leading article, "Mass Tuberculin Testing," you say that the proportion of London school-children positive to tuberculin is startlingly low.

I would have thought that this would have been an expected finding in view of the efforts made both nationally and locally against tuberculosis. What is most significant is the figure you give of 75% of the 6·5% positive reactors in the mid-Wales survey which were traced to a human source. This draws attention to the inestimable value of the tuberculin test as a weapon in the hands of the epidemiologist in the tracing of spreading infection.

In the past, when the number of positive reactors in the population was high, the use of the tuberculin test was very much limited in this field; but now that there is such a high proportion of negative reactors, we must be careful to make capital of this position in the control of tuberculosis. Mass B.C.G. immunisation will destroy this present advantage, and until we have more valid statistical evidence of the value of B.C.G. we would do well to hasten slowly.

Manchester, 3. IAN G. TAYLOR.

SIR,—I was interested in the article by Dr. Carroll Palmer and his colleagues and by the leading article in your issue of Dec. 18.

Unless the reasons are very strong, I think it would be a great pity to replace the 10 T.U. intradermal tuberculin test by one of 5 T.U. In this country, largely as a result of the Prophit Survey and the recommendation of the Ministry of Health (memo. 324/B.C.G.), the 10 T.U. Mantoux test has been in general use as a screen test and many of us are now beginning to feel some confidence in its interpretation.

I am in full agreement with your leader and with the W.H.O. Expert Committee on Tuberculosis, who insist "that B.C.G. vaccination campaigns should be centrally organised and made part of the general public-health programme"; but I am sure the suggested method of carrying out this work—namely, the employment of one mass-radiography unit in each region—is not practicable. Consider, for a moment, a single group of the community—children in their 14th year. The X-ray examination and B.C.G. vaccination of these children must be carried out at school during the spring or autumn terms, the summer term being fully occupied with examinations, sports, and other activities.

Mass radiography of this group in Cornwall (approximately 4000 children, scattered among 175 schools) occupies the mass-radiography unit for nine weeks. The population of Cornwall (341,463) is approximately a tenth of the population of the South-Western Region, which includes Devon, Cornwall, Somerset, Wiltshire, Gloucestershire, and parts of Dorset. It would, therefore, be quite impossible for one mass-radiography unit to carry out mass radiography, Mantoux testing, and B.C.G. vaccination of this single group of the community in the time available. Moreover, the mass-radiography unit is a highly skilled and specialised unit, adapted for its purpose. It would be uneconomic to employ it in routine tuberculin testing and B.C.G. vaccination.

For the past two years, Cornish school-children in their 14th year, whose parents are willing (approximately 85% consent), have been passed through the mass-radiography unit, tuberculin tested, and given B.C.G. vaccination where indicated.

The mass-radiography unit visits 11 centres at which the children from the surrounding schools are assembled. Tuberculin testing is carried out by the assistant county medical officer or the school medical officer, assisted by the school nurse, as part of their routine duties. Three days later, a chest physician visits the school to carry out B.C.G. vaccination. An exception is made in smaller, isolated schools, where all the work is done by the assistant county medical officer or the school medical officer. The sharing of this preventive work by the director of the mass-radiography service, the chest physician, and the local-authority medical officer is, I think, of great value in integrating the two sides of the tuberculosis service. It has the added economic advantage of not requiring any additional staff.

County Hall, Truro. E. R. HARGREAVES.

PEPTIC ULCERATION IN SOUTHERN NIGERIA

SIR,—Mr. Konstam's observations (Nov. 20) on the incidence of duodenal ulcer in Southern Nigeria and the influence of diet open a wide field of interesting and useful research; but I do not think he should so lightly discount the psychosomatic side, because the outward appearance of dignified calm and placidity of the average Yoruba, be he peasant or townsman, is deceptive. Having once worked as medical officer in charge of Adeyoyo Hospital, I found the Yoruba to be highly strung and sensitive, and surrounded by complexities of tribal, family, and personal life which would give the average European an easily explained ulcer. The "simple peasant" in the South does not exist. He is just as worried about his cassava crop as Mr. Jones is over his overdraft. The market woman at the hospital gate with a small pile of groundnuts for sale in front of her is very likely the owner of a fleet of produce lorries and does four-figure deals with the Cocoa Marketing Board.

The examination of physiological fluids is child's play compared with understanding the intricacies of the psychosomatic side of the African.

Cape Town. H. WATSON SMITH.

A BLOOD-TRANSFUSION PUMP

SIR,—A rotary pump for use with all forms of intravenous therapy was fully described by Mr. Victor Riddell in his book, *Blood Transfusion*, published in 1939. It was described and illustrated again in Mr. Keynes's more recent symposium on the same subject.

This type of pump provides a simple and efficient method for the rapid replacement of blood when this is indicated.

London, S.W.1. ERNEST LANDAU.

GOITROGENIC HAZARD OF COBALT

SIR,—We have read with interest the letter from Dr. Gairdner and his colleagues in your issue of Dec. 18. We fully agree that cobalt should not be added to iron preparations for general use, but we feel that it would be unfortunate if clinicians were discouraged from prescribing a drug useful in the prevention and treatment of the anæmia of prematurity and other iron-resistant anæmias.

We have reported [1] the use of cobalt sulphate in 71 premature infants (maximum dose 20 mg. daily for four weeks), and a further paper dealing with its use in various iron-resistant anæmias in childhood is in the press.

Over 200 other children, both prematures and infants with infection, have been successfully treated and no toxic effects noted in any case. The majority of our cases were treated from three to four weeks, but in some treatment was continued for eight weeks with no adverse results.

There is now a considerable literature referring to the hæmopoietic action of cobalt in both man and animals with no reference to goitrogenic activity until the paper quoted by Dr. Gairdner, and we feel that the beneficial effects of cobalt fully justify its continued use in selected cases under careful supervision.

URSULA JAMES
London, W.1. B. L. COLES.

PROLONGED PREGNANCY

SIR,—In your issue of Dec. 11 Mr. Stenhouse has asked two questions and I should like to reply.

When I saw my patient for the first time at 38 weeks, the presenting part was not engaged and the long and firmly closed primiparous cervix suggested that conditions were most unfavourable for an attempt at induction of labour. I was anxious to avoid anything but spontaneous delivery, it seemed certain that the position would improve with delay for a week or two, and the normal onset of labour was awaited with confidence. Quite naturally I did not anticipate the actual sequel. Later when labour was in progress, it became clear that delivery was obstructed. With the lowest part of the cephalic pole scarcely advanced to the level of the mid-pelvis, and with the certainty of seriously abnormal structures still at or above the pelvic brim, embryotomy was not in my view a procedure to consider. As events proved it would have been extremely difficult and therefore dangerous.

I have lately found a reference to an analysis of anencephaly by Mr. Percy Malpas as long ago as 1933.[2] There was postmaturity in 9 cases out of a series of 44, and in one instance the pregnancy lasted for 374 days.

Woking Maternity Hospital, Surrey. L. G. HIGGINS.

1. Coles, B. L., James, U. *Arch. Dis. Child.* 1954, **29**, 85.
2. *J. Obstet. Gynæc., Brit. Emp.* 1951, **58**, 103.

INNOCUOUS TEMPORARY IMMOBILITY

SIR,—The condition which was described under the title Night Nurses's Paralysis in your last issue can cause much alarm when temporary immobility occurs for the first time and the sufferer is unaware of its harmlessness.

I have drawn attention in the past [1–3] to the occurrence of this condition in persons engaged in other occupations —more especially printers. Since immobility can occur during the day as well as the night, and in persons other than nurses, the name is clearly a misnomer, though it has been in use for many years, and it was used in lectures given to nurses at some mental hospitals in the earlier part of this century.

The condition is widespread and occurs in all climates. I have known it on board ship in the Arctic Ocean, and in places as far apart as Montreal, Macclesfield, Gibraltar, and India.

In a recent investigation which I conducted, 60 male and female nurses were questioned, and 25 (42%) knew of the condition, 19 (32%) having suffered from one or more attacks. In a previous inquiry,[1] of 67 male and female nurses, 27 (40%) were aware of its existence, but only 12 (18%) had suffered from attacks. The latest investigation did not add to the 16 conditions from which the immobility must be distinguished,[2] but it led to a fuller appreciation of the existence of partial attacks, of attacks in those other than nurses, and of the further dangers to the subject during the course of an attack.

Partial Attacks.—In 3 cases the ocular muscles were the only ones involved.

A matron reported that, from time to time, when reading in the day or night, she was unable to move her eyes from the end of one line of print to the beginning of the next. This was so frequent that she thought it was a normal occurrence in everyone. A female nurse said that her eyes became fixed at any part of a line of print when reading at night; and a male nurse, who also suffered from generalised immobility of up to 5 minutes' duration timed by the clock, stated that at night his eyes became fixed, for about 30 seconds or so, at any part of the line.

An observer said that, on 3 occasions, he saw a male nurse's hand stop writing for a few seconds. Suddenly, the nurse found he could write again. During the attacks the nurse was able to talk and make other movements. One person was able to smile in an attack and 2 were able to talk, although indistinctly in one case.

An observer noted that the male nurse whom he was relieving was apparently watching him and turned his head towards him, but was unable to move until the observer took hold of his arm, when he suddenly jumped up.

Attacks in Non-nurses.—There were 2 additional definite attacks and 1 doubtful attack in this investigation.

A warrant officer, who was sniping in front of his trench in Macedonia as he had done many times previously, found that, although his finger was on the trigger and 3 Germans in his sight, he could not fire, nor did he answer the telephone beside him until it had buzzed three times. He was asked why he had not fired. He then did so.

A sergeant was sitting leaning back against a tree in France at 7 A.M., when an officer approached. The officer said "Get up, Sergeant, get up," but he was unable to move, although in front of his men. The officer had left before he was able to rise, but the sergeant apologised to him later.

The doubtful attack involved a radar operator on a ship who, although he saw an object on his screen, was unable to report its presence to the bridge. The officer on the bridge saw the ship and asked him why he had not reported. This has not been classified as a definite attack because no other person was in the radar cabinet and the operator might have been sleeping.

Occurrences During Attack.—A night nurse in a mental hospital said he was sitting down when he saw a patient approach him with a chair. The patient struck him with the chair, and the nurse was unable to defend himself. The nurse watched the patient approach, so the possibility of immobility due to fear cannot be excluded, although in mental hospitals, the nursing staff are accustomed to dealing with troublesome and dangerous patients.

This identification of partial attacks raises the question of cause. Previously, an attack comprising immobility of the legs alone was the only partial attack recorded. This further inquiry shows that small portions of the motor system can be affected. The site of the failure is obscure, but in view of the observation that small jerky movements may occur before full movement returns it seems that some impulses can get through to the muscles from consciousness. As, in many cases, only one attack has occurred over 30, 40, or more years, the condition does not appear to be a permanent psychological condition, such as hysteria. This immobility may be due to defective transmission at the myoneural junctions, although it is hard to see why only certain junctions should be affected in some cases, or why, in one man, all voluntary muscles were affected on some occasions and only the ocular muscles on others. But myoneural block seems to be the most likely explanation, particularly since the condition usually occurs when the subject is stationary.

Bristol. G. DE M. RUDOLF.

1. Rudolf, G. de M. *Bristol med.-chir. J.* 1946, **63**, 132.
2. Rudolf, G. de M. *J. ment. Sci.* 1946, **92**, 814.
3. Rudolf G. de M. *Ibid*, 1947, **93**, 369.

INTRAMUSCULAR IRON

SIR,—Dr. Jennison and Dr. Ellis, in their article of Dec. 18, conclude that local reactions to iron-dextran are seldom important, and general reactions very mild. We have had two severe reactions recently.

The first was in a man of 54, with ulcerative colitis and anæmia, who was given three 2 ml. intramuscular injections of the iron-dextran solution on alternate days. After the second he complained of local soreness, and after the third he had pain in both buttocks and fever to 102°F. Over the next forty-eight hours, the outer parts of the buttocks became painfully swollen, red, tender, and indurated, and the inguinal glands grossly enlarged and tender. No further injections were given and the condition settled down completely within eight days without suppuration or the use of antibiotics. There was a past history of skin allergy, which suggested an allergic basis for this reaction.

The second case concerned a boy of 17 with steatorrhœa and anæmia. He received 1·5 ml. of the iron-dextran solution intravenously. At once he became flushed, distressed, and restless; bradycardia was noted; and a few minutes later he complained of severe pain in the loins, which gradually settled in $1^1/_2$ hours.

It seems, therefore, that this iron-dextran preparation should be given further extensive trial before its general use is advocated.

The London Hospital, E.1. IAN P. ROSS.

SMALL-BOWEL DISTURBANCES AFTER ABDOMINAL OPERATIONS

SIR,—Your report of Dec. 18 mentions a statement by me at a meeting of the surgical section of the Royal Society of Medicine, when I gave the figure of 8% for the prevalence of atrophic gastritis after partial gastrectomy. My comment was an unprepared reply to the unexpected compliment of a question by the president and I would be glad to extend it.

In the past eight years I have gastroscoped an average of just under 225 patients a year, and the proportion of these examined for post-gastrectomy symptoms has risen fairly steadily (excluding one year when the total was 333 patients when we made special examinations within a week of hæmatemesis) from 0·7% in 1947 to 8% in 1954. Of the last 53 gastrectomised patients 4 had atrophic gastritis. It would have been wiser not to give this proportion as a percentage, but the figures are not negligible. Professor Witts had commented on this

earlier in the same meeting. 2 of my patients had severe hypochromic anæmia (atrophy confirmed in 1 by biopsy), and a minor group of post-gastrectomy syndrome may be attributed to gastric mucosal atrophy.

May I add an example of operative disturbance of small-intestinal function I would have quoted if I had had the presence of mind? About 1908 a girl, aged about six, was severely burned and developed a stenosing duodenal ulcer. Sir Henry Souttar found it necessary to do a gastro-enterostomy, and she recovered. About 1942 I treated her for microcytic anæmia, and about 1946 for œdema and hypoproteinæmia. Shortly after discharge she returned with acute obstruction of the small intestine due to a band apparently connected with her previous operation. This was divided and she has apparently remained well since. It seems as if obstruction disturbed iron absorption first, protein absorption next, and finally the total arterial supply of the bowel.

Hove, Sussex. W. A. BOURNE.

STRANGE LANGUAGES

SIR,—During the late war the Army Education Corps put out several useful booklets on foreign languages. In view of the large number of Maltese, Somalis, Greeks, and Cypriots entering this country, could not the Ministry of Health publish similar pamphlets, obtainable on demand, for doctors near docks, &c.? They could contain colloquial speech and popular medical terms. They would be more useful to me than my extra chair for an interpreter—and a "no smoking" sign in nine tongues.

Mile End, London, E.1. N. D. WAYNE.

MECHANISM OF RAYNAUD'S PHENOMENON

SIR,—Lewis established that cooling of the fingers produces vasoconstriction, followed by vasodilatation.[1] He maintained[2] that excessive vasoconstriction alone was the cause of Raynaud's phenomenon, but later observations have failed to support this view.

Hertzman and Roth,[3] investigating a mild case of this disease, showed that although vasodilatation did not follow vasoconstriction when the patient's finger was placed in water at 15°C, vasodilatation did ensue when the water was colder (8°C). Greenfield and Shepherd[4] showed, moreover, that when healthy persons placed their fingers in water at 0–6°C blood-flow in the digital arteries almost ceased (rapid dilatation followed after 5–10 minutes). It has also been found[5] that the vessels of healthy persons, and of those with Raynaud's disease, respond equally to adrenaline.

Using the calorimetric method of Greenfield and Shepherd,[4] we compared the vascular response to cold in 20 patients suffering from Raynaud's syndrome with the response in a control group of 20 healthy persons. Each subject first immersed his hand for 10 minutes in a water bath at 25°C and thereafter held his finger for 15 minutes in a calorimeter at 9·5°C.[6]

We observed that:

(1) The degree of initial vasoconstriction was the same in the two groups.

(2) In the control group dilatation ensued after 4–6 minutes in 18 cases, during the 7th minute in 1 case, and during the 8th minute in another; in the patients with Raynaud's syndrome no dilatation occurred in 13 cases during the 15 minutes, and in the remaining 7 cases it occurred later, and to a lesser degree, than in the controls.

This suggests that the essential difference between healthy persons and those with Raynaud's syndrome is in the capacity of their digital circulation to respond to the stimulus of cold by vasodilatation. We attribute this to a local vascular defect in the mechanism of dilatation.

No noxious agent is known which increases the response of vessels to constrictor agents and at the same time leaves unaffected the mechanism of dilatation. But it has been observed that vasodilatation caused by cooling the perfused hind limb of a cat is abolished by sodium cyanide[7]; that iodoacetic acid prevents reactive hyperæmia and dilatation due to nitroglycerin[8]; and that the sensitivity to acetylcholine of the vessels in a perfused rabbit's ear, and the synthesis of acetylcholine, are both decreased by complete sympathectomy of the vessels.[9,10]

The mechanism of dilatation, it seems, depends upon metabolic processes in the vessel wall, and any upset in these processes will disturb the mechanism. Some such upset, we believe, is responsible for the absence of vasodilatation in Raynaud's syndrome.

Institute of Industrial Hygiene, Budapest. L. MAGOS
G. OKOS.

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AN UNUSUAL CASE OF SHINGLES

SIR,—Herpes zoster can be a difficult enough problem in the emotionally healthy patient, but when the condition occurs in a neurotic patient the interval (usually a few days) between pain and rash may be an embarrassing time for the doctor.

A patient of mine, a man of 59, who is prone to neurotic symptoms, complained of pain in the right lower chest and hypochondrium. There were no abnormal signs—which is the usual finding in this case. The pain persisted and gathered strength for the next eight and a half weeks, during which time he had repeated examinations by me, he consulted a naturopath, and finally saw a surgeon, who ordered a radiograph of the chest and a cholecystogram, which were both normal. Neither the surgeon nor I could be drawn about the diagnosis, though the naturopath had a shot at cholecystitis.

The doctor-patient relationship gradually worsened until approximately sixty-one days after the first consultation, when a characteristic herpetic eruption appeared in the distribution of the pain.

The illness had not yet exacted its full toll, as the herpes lesion and the post-herpetic neuralgia incapacitated him for a further fifteen weeks.

London, S.E.26. R. N. JACKSON.

VENEREOLOGY AND DERMATOLOGY

SIR,—We note with concern the advertisement that you published for the South East Metropolitan Regional Hospital Board on Dec. 18, concerning a vacancy for a consultant combining the two specialties of venereology and dermatology. This follows a similar appointment which was made some months ago by the East Anglian Regional Hospital Board. These two special subjects have few points of contact. For a number of years general policy has favoured dissolution of a union which has nothing to recommend it beyond administrative convenience and which, when it was common practice, affected adversely the standards of both subjects.

As the result of this policy, which we commend, registrars who have been appointed to departments of venereology or dermatology are being trained as specialists in their respective fields and have had no opportunity of acquiring specialist knowledge of the other subject. As the result they are ineligible for the appointment which you advertised.

We suggest that the institution of such a combined appointment is a retrograde step which is unfair to young men and women working in these subjects and must lead

inevitably to inferior standards of work in one or other subject, depending upon who is appointed to the vacancy. To us it seems highly undesirable that these considerations should be regarded as less important than administrative convenience.

AMBROSE KING
BRIAN RUSSELL.

The London Hospital, E.1.

SALARY AND LEAVE SCALES

SIR,—I wonder why it has just been decided to fix £1050 as the salary point at which hospital medical staff can claim six weeks' leave. I notice the new scale is to come into force as from April 1, 1955. As I received my latest increment in October, putting me at £1025, do I now have to wait till next October before I can claim six weeks' leave? Why has the reputable figure of £1000 now been withdrawn? I can see no reason for fixing on the higher figure of £1050. Is this just another piece of officialdom at the expense of junior hospital medical staff?

Sutton, Surrey. J. B. GURNEY SMITH.

STREPTOMYCIN WITHOUT TEARS

SIR,—Those of us who have to treat tuberculous children are often upset at the distress caused by a daily injection of streptomycin, given over a period of months. A year ago we started to give these injections routinely one hour after the child had fallen asleep, with most satisfactory results.

The efficacy of this method is well shown by the small boy who started with daytime injections, and then changed to the nightly routine. When I pointed to some recent puncture marks on his thigh, and asked what they were, his answer was "Oh, that's where I *used* to have my pricks."

If others are not using this method, they should at least give it a trial.

St Thomas's Hospital, London, S.E.1. M. PICKERING PICK.

CANCER OF THE LUNG

SIR,—On Feb. 12 last the Minister of Health, in a written answer, stated he had received advice from the Standing Advisory Committee on Cancer and Radiotherapy, on the question of the relationship between smoking and lung cancer. In his statement the Minister declared that it must be regarded that there is a relationship, and that there is a strong presumption the relationship is causal. He added that other factors may be operating—e.g., atmospheric pollution—and that it is desirable that young people should be warned of the risks apparently attendant on excessive smoking, and that it would appear that the risk increases with the amount smoked, particularly of cigarettes.

In his report on the State of the Public Health in 1953, the chief medical officer of the Ministry of Health describes the inexorable march of cancer of the lung as "mysterious." May I suggest that this description is misleading and is apt to discourage those who have influence with the community from giving the advice proffered by the Minister to young people.

Granted that the specific carcinogenic factor has not been isolated as yet, there is no real mystery associated with a condition that in 1953 was responsible for 27% of all male deaths from cancer.

House of Commons, London, S.W.1. BARNETT STROSS.

SIR,—May I support Dr. Joules's plea, in your Christmas Day issue, for honesty in facing the implications of the apparently causal relationship between cigarette smoking and cancer of the lung?

The community suffers from a mass addiction to the drug of tobacco and is bombarded with advertisements by all those with an interest in maintaining this addiction. We are ill served by the chief medical officer, who may be regarded as the High Priest of Preventive Medicine, if he suggests in an official report that the cause of lung cancer is akin to the mysteries of religion. The march of this disease will certainly be inexorable if the interests of the tobacco trade and the revenue are allowed to obscure the authoritative warning that should be given to the public.

Barnet, Hertfordshire. DOUGLAS MCCLEAN.

Parliament

QUESTION TIME

End of Agene

Replying to a question Mr. HEATHCOAT AMORY, Minister of Food, said that he had now received a report from the subcommittee, set up under the chairmanship of the chief medical officer of the Ministry of Health, to consider flour-improvers. A detailed experimental study had been made under the Medical Research Council. The methods of flour-improvement which had been examined were agene, chlorine dioxide, potassium bromate, ascorbic acid, and an aeration process. The experiments had confirmed that agene-treated flour when fed in large quantities caused fits in dogs and had shown that none of the other improvers tested did the same. Since other methods of flour-improvement existed which had not produced these symptoms in animals, the Government were of the opinion that, although no ill effects in man due to the use of agenised flour had been established, effect should now be given to the decision taken in 1950 to discontinue agene.

In view of this decision, the National Association of British and Irish Millers had agreed to recommend their members to discontinue the use of agene and to give an undertaking that the equipment for treating flour in this way would be removed from their mills by December 31, 1955. Some delay was inevitable because new equipment had to be obtained to treat flour by other means. The National Association of Flour Importers had similarly agreed to recommend their members to ensure that no flour treated with agene would be imported by them.

The further investigations undertaken by the Medical Research Council had revealed some differences between the effects on flour of the other methods of improvement, but the effects demonstrated were not sufficient to require the discontinuance of any of the other flour-improving processes. These methods of flour-improvement would continue to be kept under close scrutiny in collaboration with the milling and baking industries.

The Case of Mrs. Christofi

Replying to questions on the case of Mrs. Christofi, Mr. GWILYM LLOYD-GEORGE, the Home Secretary, said that Parliament had on many occasions recognised the undesirability of pressing the Home Secretary to disclose the reasons why he did or did not tender advice to the Crown with regard to the exercise of the prerogative of mercy in a capital case. The principal medical officer of Holloway prison had stated in a report, dated Oct. 5, 1954, that he had formed the conclusion that Mrs. Christofi was insane, but was medically fit to plead and to stand trial. A copy of that report was furnished to the defence.

In view of this report, he had appointed three distinguished and experienced doctors to conduct an inquiry in accordance with the law. The three doctors reported that the prisoner was not, in their view, insane; and they added that in their view she did not suffer from any minor mental abnormality which would justify them in making any recommendations on medical grounds relevant to the question of a reprieve.

After full consideration he came to the conclusion that there were no sufficient grounds for interference with the due process of law. It would be contrary to long-established practice, and, as he thought, open to considerable objection, to disclose any advice tendered to the Home Secretary in a case of this kind by the trial judge, or to disclose the terms of the medical report submitted by the statutory inquiry, and he was not prepared to make these documents available. There was no electro-encephalograph examination of Mrs. Christofi as she would not agree to the examination being made.

Clinical Experiments at Hospitals

Replying to questions, Miss PATRICIA HORNSBY-SMITH, parliamentary secretary to the Ministry of Health, said that hospital authorities were given power to conduct research by section 16 of the National Health Service Act, 1946. Individual clinical investigations were undertaken on the authority of the clinician in charge of the case, and the Minister had not complete knowledge of the extent of all the work in progress at hospitals. Such investigations involved medical and ethical problems which were not susceptible of control by regulations.

Refunds of Prescription Charges

Replying to a question, Mr. OSBERT PEAKE, Minister of Pensions and National Insurance, said that from Oct. 1, 1953, to Sept. 30, 1954, the National Assistance Board refunded rather more than $9^1/_4$ million shilling charges for the dispensing of prescriptions. A small number of these refunds were made to people not receiving a regular weekly National Assistance grant.

Monopack Hearing-aids

Replying to a question, Miss HORNSBY-SMITH said that large-scale clinical trials of a new 'Medresco' model, capable of being used in either monopack or duopack form, were to be held in the New Year with the coöperation of schools for the deaf and partially deaf. If these proved successful, it ought to be possible to begin mass-production about the end of 1955. It was proposed to supply miniature batteries for use with the aid in its monopack form free of charge for children, but adults who wished to use the aid in this form would need to buy batteries for themselves. They would, of course, still be able to obtain the larger batteries without charge.

Mass Radiography

Replying to a question, Miss HORNSBY-SMITH said that up to the end of 1953 the 68 mass-radiography units had made 13,396,538 examinations, in about 5% of which some abnormality, not necessarily requiring treatment, was revealed.

Orthodontic Treatment for School-children

Mr. ANGUS MAUDE asked the Minister of Education how many orthodontic specialists were available, full or part time, for the treatment of children in England and Wales under the school dental service.—Sir DAVID ECCLES replied: There were the equivalent of 17 full-time officers, employed exclusively on orthodontic treatment, in the school health service on June 30, 1954, the latest date for which information is available. This is an increase of the equivalent of 4 full-time officers in the last two years. The majority of school dental officers undertake some orthodontic treatment.

Hospitals and Dental Treatment

Miss HORNSBY-SMITH, replying to a question, said that the work being done by all grades of hospital dental staff, other than house-officers, at Dec. 31, 1953, was the equivalent of 3803 sessions weekly. The total number of beds allocated to consultant dentistry at that date was 249.

Pulmonary Tuberculosis among Student Nurses

Mr. SOMERVILLE HASTINGS asked the Minister what percentage of student nurses in their first year developed pulmonary tuberculosis in 1953.—Miss HORNSBY-SMITH replied: I regret that this information is not available.

Birth-control in the Colonial Territories

Mr. T. REID asked the Secretary of State for the Colonies in which of these Territories any system of teaching birth-control to the people had been established.—Mr. A. T. LENNOX-BOYD replied: So far as I know, no Colonial government has established any such system, but voluntary organisations are at work in some Territories, and in Singapore a government grant is made to such an organisation.

Industrial Health

Replying to a question Mr. HAROLD WATKINSON, parliamentary secretary to the Ministry of Labour, said that the advisory committee on industrial health would be an advisory body. The scheme for the development of industrial health services, including any necessary surveys, would be carried out through the Factory Inspectorate, which possessed wide powers under the Factories Acts.

Public Health

Lead Poisoning in Rotherham

ON Dec. 20 the medical officer of health for Rotherham, Dr. J. A. Gillet, was told that two twin boys of $3^1/_2$ from Rotherham, admitted to the Children's Hospital, Sheffield, that morning, had been diagnosed as suffering from lead poisoning. He also learned that a younger brother of 2 had died in Rotherham General Hospital on Dec. 15, the cause of death being given, after a post-mortem examination, as status epilepticus due to idiopathic epilepsy. He got in touch with the family doctor and heard more details of the history of the three cases. Arrangements were then made for the inspection of the area where the children lived by members of the staff of the Rotherham health department. It was found that old vulcanite car-battery cases were being used for fuel in some homes. It seemed that a scrap-dealer, after removing the lead plates, was either selling or giving the cases away to nearby residents.

Dr. Gillet and members of his staff visited the home of the three children and found the grandmother, together with a son and a younger married daughter and her baby, at home. The old lady, who was edentulous, anæmic, and constipated, complained of a metallic taste in her mouth. The son had no symptoms, but there was a suspicious blue line on his gums. The daughter and her baby had no signs or symptoms of lead poisoning. In the meantime the chief sanitary inspector had found old battery cases in the coal house and had been told that they were burning them for fuel. Samples of the cases and of the resultant ashes were taken for examination.

The police arranged to broadcast a message warning householders not to burn any car-battery cases, and further help was obtained from the local press.

During a house-to-house visit in the district, the names and addresses were collected of all the occupants of houses where vulcanite cases had been burnt. The source of supply of the cases was stopped.

It was then learned that a child of 5 who lived in the same area had died on Nov. 21, the cause of death being given as cholæmia and infective hepatitis. Arrangements were made for two brothers of this child to be examined and they were later admitted to hospital suffering from lead poisoning.

In view of the danger of lead encephalopathy, which has a far more serious effect on children than lead poisoning on adults, it was decided to concentrate at the outset on the children in the affected district. Arrangements were made with the pathologists of the Public Health Laboratory, Sheffield, and of the Moorgate General Hospital, Rotherham, to take a blood-count and film of all children exposed to risk, and this inquiry began on Dec. 23. Up to the present 127 children and 123 adults from 41 houses are known to have been exposed. The arrangements for blood tests are being continued at the hospital. On Dec. 22 medical officers from the health department visited the affected houses and examined the adults; where necessary blood tests were arranged. A circular to all medical practitioners in the district was sent out by hand on Dec. 22 informing them of the outbreak and of the arrangements made for the examination of suspected cases.

As to the disposal of the ashes and old cases, it so happened that the house refuse was collected from the affected district on Dec. 21, and a considerable amount was therefore removed. A special collection was organised as a further precaution and over 3 tons of cases and ashes were collected and removed on Dec. 22.

The lead may have been absorbed through the skin (an unlikely route), by inhalation of ash or fumes given off by the burning cases, or by ingestion of food contaminated by dust and by handling the casings and contaminating food with unwashed hands. Some of the younger children may have sucked a piece of the casing. Further investigations are proceeding.

Third Quarter in Scotland

In the quarter ended Sept. 30, 1954, the infant-mortality rate of 24 per 1000 live births was the lowest yet recorded in Scotland, and 8 below the five-year average. Neonatal deaths numbered 16 per 1000 live

births, 3 less than in the corresponding quarter of 1953. The birth-rate was 17·7 per 1000 population—0·4 below the five-year average. Stillbirths amounted to 26 per 1000 total births. The death-rate (10·3 per 1000 population) was 0·2 above the average. Deaths from tuberculosis amounted to 17 (respiratory 15) per 100,000 population, compared with 21 (18) in the third quarter of 1953 and a five-year average of 36 (31). There were 206 deaths from malignant disease per 100,000 population—10 more than in the corresponding quarter of 1953, and 16 above the five-year average.

Obituary

ELIZABETH CASSON

O.B.E., M.D. Brist., D.P.M.

Dr. Elizabeth Casson, founder and for many years director of the Dorset House School of Occupational Therapy, died in Bristol on Dec. 17.

She was born in 1881, the third daughter of the late Major Thomas Casson of Denbigh, and she was a sister of Sir Lewis Casson. She was educated at St. Mary's College, Paddington, and later studied housing management. In 1908 she joined Octavia Hill's stalwart helpers in Southwark and seemed to have found her life's work.

But conditions in South London showed her all too clearly that her tenants, as well as their tenements, needed repairs. At the age of 30 she surprised her friends by taking her matriculation and beginning to study medicine.

She graduated M.B. in 1919 and soon afterwards joined the staff of the Royal Holloway Sanatorium, Virginia Water. In 1922 she took her D.P.M. and in 1926 she proceeded to her M.D. degree. In 1927 she was awarded the Gaskell prize.

She herself has described how she came to realise the importance of occupation as a form of therapy.

"I found it difficult to get used to the atmosphere of bored idleness in the day rooms at the mental hospital. Then, one Monday morning, when I arrived at the women's wards, I found the atmosphere had completely changed and realised that preparations for Christmas decorations had begun. The ward sisters had produced coloured tissue paper and bare branches, and all the patients were working happily in groups making flowers and leaves and using all their artistic talents with real interest and pleasure. I knew from that moment that such occupation was an integral part of treatment and must be provided."

At Holloway Sanatorium she found a tradition of crafts and games; entertainments, sports, exhibitions were all held regularly. But it was all voluntary and no work was prescribed by the medical staff. On a visit to the Gart Naval Hospital in Glasgow she saw real "occupational therapy" for the first time in Dr. (now Sir) David Henderson's small department. Later she visited the larger department at Bloomingdale Hospital in New York. She continued to seek out all the hospitals in England where the idea was gaining ground, including Nayland Sanatorium and the Lady Chichester Hospital in Brighton. In 1929 she left Virginia Water to open a residential clinic at Dorset House, on Clifton Down, near Bristol. She was determined to arrange a full-time planned day for all her patients, and from this grew the Dorset House School of Occupational Therapy. Soon afterwards a small department was opened at the Bristol General Hospital to show how occupational therapy could also be used for patients with physical diseases.

The work continued to develop steadily and in 1936 the inaugural meeting of the Association of Occupational Therapists was held at Dorset House. Shortly before the war the staff of the school helped in the planning and opening of the Allendale curative workshop, and Dr. Casson reported in our columns in 1941 on the first 40 cases treated there (*Lancet*, 1941, ii, 516).

With the war Bristol became an unsuitable place in which to run a school, and after some months of anxious negotiations Dr. Casson arranged for her students to move to Barnsley Hall Hospital, Bromsgrove. After the war the school found new quarters at the Churchill Hospital in Oxford, but Dr. Casson continued to act as medical director and paid frequent visits from Bristol. In 1951 she was appointed O.B.E.

F. S. C. writes: "The memory of Elizabeth Casson will be cherished not only as an able psychiatrist and charming colleague, but also as the founder of the first school of occupational therapy in this country. Soon after the late Sir Robert Jones had demonstrated the value of the curative workshop, she saw the need for trained personnel and recognised that, besides a knowledge of suitable crafts, the therapist must understand the nature of illness and how work therapy could help patients with both mental and physical disorders back to health. From her own resources she established the Dorset House School of Occupational Therapy and sustained it by her teaching, forthright leadership, and generosity throughout the difficult period of evacuation and expansion during the war until it was safely established under an independent board of governors of which she was a member. Occupational therapy today owes a great deal to the foresight and example of Elizabeth Casson."

WILLIAM JOHN HANDFIELD HASLETT

Kt., M.R.C.S., J.P.

Sir William Haslett, who died on Dec. 17 at Weybridge, was for many years a valued member of the Middlesex County Council. His public service was inspired and directed by his medical training and experience, and as chairman of the council's committee for the care of mental defectives he was actively concerned in setting up colonies for the mentally handicapped.

He was born in Donegal in 1866, the son of Dr. S. Torrens Haslett of the Colonial Medical Service. He was educated at the Academical Institute, Londonderry, Trinity College, Dublin, and the London Hospital. After qualifying in 1889 he held resident appointments at the Poplar Hospital and St. Luke's Hospital for the Insane, and a clinical assistantship at the National Hospital for Paralysis and Epilepsy. In 1892 he became proprietor and medical superintendent of Halliford House, a private mental hospital at Sunbury-on-Thames.

Soon after he settled at Sunbury he was elected to the Staines board of guardians, the Middlesex insurance committee, and the Sunbury urban council. All these interests were a preparation for his work on the county council. He was also a justice of the peace for Middlesex. He was created a knight in 1938 for his public services.

Sir William married in 1922 Norah, daughter of Mr. W. A. Macan. She survives him with a son and three daughters.

Appointments

ELLIOT, MARGARET M., M.B. Sheff.: school M.O., Sheffield.

GHOSH, A. K., M.B. Calcutta, D.OBST.: registrar in obstetrics and gynæcology, Peterborough Memorial Hospital.

KELLY, J. F., M.B. N.U.I., D.P.H.: asst. M.O., British Railways (London Midland region).

McGRATH, S. D., M.R.C.P.I., D.P.M.: resident medical director, St. John of God Private Psychiatric Hospital, Stillorgan, co. Dublin.

MORGAN, J. D., M.B. Sheff., F.R.C.S.: consultant orthopædic surgeon, Wingfield Morris Orthopædic Hospital, and accident service of the United Oxford Hospitals.

*PAUL, JACK, M.B. Witw'rand, D.C.H.: appointed factory doctor, Tottenham, Middlesex.

PORTER, K. R. D., M.B.E., M.R.C.S., D.P.H.: deputy senior administrative M.O., Oxford R.H.B.

PUGH, R. C. B., M.D. Lond.: whole-time clinical pathologist, St. Peter's, St. Paul's and St. Philip's Hospitals, London.

WILLIAMS, J. H., M.B. Lond.: asst. M.O., British Railways (London Midland region).

South-Western Regional Hospital Board:

EARLE, B. V., M.D. Dubl., M.R.C.P., D.P.M.: consultant psychiatrist, Exeter clinical area.

MOORE, H. D., M.B. Sydney, F.R.C.S., F.R.C.S.E.: consultant surgeon, Exeter clinical area.

PAYNE, I. W., M.B. Manc., F.R.C.S., D.O.M.S.: consultant ophthalmologist, Plymouth clinical area.

* Amended notice.

Notes and News

THERAPEUTIC SUBSTANCES

THE Therapeutic Substances Act, 1925, has been amended to include within its schedule parenteral preparations of oxytetracycline; and the Therapeutic Substances Regulations, 1952, have been amended to include methods of preparing this drug.[1] Oxytetracycline is removed from the list of substances which may be sold only on the prescription of a doctor, dentist, or veterinary surgeon.[2] More up-to-date regulations for insulin preparations are approved.[1] Erythromycin, neomycin, oxytetracycline, polymyxins, cortisone, corticotrophin, and hydrocortisone are added to the substances controlled by the Penicillin Act, 1947.[3] All these measures come into operation on Jan. 1.

DISORDERS OF INFANCY

AT a meeting of the Devon and Exeter Medico-Chirurgical Society on Dec. 16, Dr. F. S. W. Brimblecombe spoke of some common disorders of childhood. It is a sombre thought, he said, that if the human female had always carried out efficiently her natural function of lactation there would have been no problems of infant feeding, uncountable millions would not have died in infancy, and the whole history of the human race might have been changed. It is only during the past half-century that we have had anything approaching an efficient substitute for breast-milk or hygienic methods of artificial feeding.

Underfeeding is common, overfeeding very rare. If a baby fails to thrive it is wise to seek the cause in the baby rather than in the feed. A baby who screams on being fed should be examined for an anal fissure. The word marasmus is now obsolescent. Most of the causes of failure to thrive can now be recognised. Wrong feeding is one, but a rare one. Another is hiatus hernia; here the function of the cardiac sphincter is lost and the patient vomits from birth especially when laid flat. The vomit contains mucus and sooner or later, owing to œsophageal ulceration, blood. Painful swallowing from the same cause produces anorexia, and occult bleeding may give rise to anæmia. The diagnosis is a clinical one, for confirmation by radiography is difficult. Feeds should be thickened and the baby sat upright. To free a stomach which has ridden up into the chest and become adherent surgery is occasionally required.

Bottle-fed babies, apparently thriving, sometimes start to vomit at the third or fourth month, become costive, and develop unexplained pyrexias. These infants need not die. Necropsy reveals calcification in the proximal renal tubules. This calcification is radiographically demonstrable during life. In these cases, first described by Dr. Reginald Lightwood, there is acidæmia with a urine constantly alkaline. This disorder, persistent renal acidosis, can be treated successfully with large doses of sodium bicarbonate. In another group, clinically similar, there is hypercalcæmia of unknown origin which is equally controllable by a calcium-free diet.

Infants are occasionally poisoned accidentally by the too-liberal application of boric powder to raw buttocks. Boric poisoning causes a generalised rash which desquamates, diarrhœa and vomiting, and perhaps coma and death. Infants who suck or gnaw at their cots which have been painted with lead paint occasionally develop lead poisoning. In infancy plumbism manifests itself in pallor, abdominal pain, drowsiness and convulsions. Radiography shows a lead line round bones, but there is no polyneuritis and blood changes are absent. Circumcision, which is responsible for sixteen deaths annually, is justified only in infants who cannot pass urine. A tight prepuce—and tongue-tie—are physiological states in infancy.

A NEW OUTPATIENT DEPARTMENT

BETWEEN 1935 and 1948, outpatient attendances at St. James' Hospital, Balham, rose from 30,000 to well over 100,000 annually, and the need for an enlarged outpatient department became urgent. The new building, which is now in use, is a notable example of imaginative hospital planning. The design's pleasing features include a large and beautifully furnished lounge for visitors or waiting patients; a pram store conveniently situated near the postnatal clinic; and two automatically operated stretcher-lifts, fitted with self-levelling devices. All internal structures have been constructed to allow alterations to be made quickly and easily: thus transverse partitions may be removed and re-erected elsewhere within a matter of minutes, and all cubicles and examination-rooms have interchangeable electrical equipment. To enable patients to find their way about, each department has its own colour-scheme, and the hospital proposes to issue appointment cards in corresponding colours. Noise in corridors is kept down by perforated "acoustic" boards in the ceilings, and the floors are made of cork tiles. Door-handles are designed for elbow-action. All furnishing fabrics are in pleasantly harmonious patterns, and particular attention has been paid to comfort and utility in designing the consulting-room furniture. The aim has been to evoke an atmosphere at once sympathetic and quietly cheerful, as well as to provide for functional efficiency.

1. The Therapeutic Substances Amendment Regulations, 1954.
2. The Therapeutic Substances (Supply of Oxytetracycline for Agricultural Purposes) Regulations, 1954.
3. The Therapeutic Substances (Control of Sale and Supply) Regulations, 1954.

OVERWEIGHT AMERICANS

THE United States Army in Europe, worried by the number of stout people in its ranks, is urging its plumper soldiers to get their weight down. Back home, it seems, things are much the same, for a report [1] now suggests that more than 20% of the population of the United States are overweight. "Overweight" was defined as 10% or more above the "desirable" weight for the individual, which was based on measurements of height, weight, and build or body type (the Metropolitan Life Insurance Company has constructed tables of desirable weights that show a range of weights for each inch of height by type of body frame). Of the overweight population, round about 10% were 20% or more above their desirable weight, and there was a relatively higher proportion of Negro females in both the 10% and 20% overweight categories.

A LIGHT SPRING CALLIPER

Mr. G. Douglas Nickels, M.C.S.P., remedial gymnast at Mount Vernon Hospital, Northwood, Middlesex, writes: The accompanying photograph shows a new light spring calliper that has been used in the department of physical medicine at Mount Vernon Hospital for the last three years. It has been developed primarily for the hemiplegic patient but has been used successfully on other patients with "drop foot." The advantages of this type of calliper are:

(1) Light weight: it weighs about 9 oz.
(2) Ease of fitting: it can be fitted by the physiotherapist in the department.
(3) Low cost: it costs about 15*s*.

The calliper is made in three sizes to fit different size shoes. It is 13$^1/_2$ in. long and measures 3$^1/_2$–4 in. under the foot. It is wound from 6 and 8 B.I.S. gauge wire. The side wires are joined at the top by a stiff leather band with strap and buckle.

1. *Publ. Hlth Rep., Wash.* 1954, **69**, 1084

For fitting, the heel of a good lace-up walking-shoe is drilled to take a 1/4 in. steel peg. This acts as the fulcrum, and makes a firm attachment for the spring. Inversion can be corrected by drilling the hole at an angle dependent on the degree of correction required. The calliper is then sprung on to the projecting ends of the peg. The calliper is not intended to be a 90° foot stop, but it is a spring designed to help the patient to lift his foot when walking.

THE SCALPEL, THE SWORD

THIS title has been given to an emotional biography of Norman Bethune, a Canadian surgeon.[1] In 1927 he was dying of pulmonary tuberculosis in a famous New York sanatorium. There he read of a wonderful new cure for his disease—artificial pneumothorax. He demanded the treatment and was cured. Later he became a skilled thoracic surgeon, but he threw up his career on the outbreak of the Spanish civil war and went to Madrid to help the anti-Fascist forces. When the war ended he returned to Canada and joined the Communist party. But his turbulent spirit called for something more exciting than civilian practice: the Chinese people were fighting against invasion, and there was an urgent need for doctors. Early in 1938 Bethune left Vancouver for Hong-Kong, taking with him enough equipment and supplies to fit up several surgical units. He reported to Mao Tse-tung, who welcomed the suggestion of a mobile operating-unit close to the front. Bethune seems to have done remarkably good work under very difficult conditions; but towards the end of 1939 he contracted fatal septicæmia from an infected operation wound. This biography carries the recommendation of the Book Society and will probably be widely read. Doctors may not be wholly convinced by the publisher's claim that "No doctor, not Hippocrates, nor Jenner, nor Pasteur, nor Sir Alexander Fleming is known and venerated by as many people as Norman Bethune."

AUTOMATIC AMPOULE INJECTOR

THE indefatigable Sir Christopher Wren somehow found time, in the midst of his more widely known pursuits, to construct one of the earliest practicable syringes. His original model,[2] which he used experimentally on dogs, consisted of a hollow quill attached to a bladder containing the fluid for injection; and in 1656 he wrote: "I am in further pursuit of this experiment which I take to be of great concernment and which will give great delight to the theory and practice of Physick." Three centuries have passed since then, and the technique of injection continues to evolve. The latest of many refinements are incorporated in the device known as the 'Ampin,'[3] which is an automatic ampoule injector for routine and emergency hypodermic injections. In America it was first demonstrated at the American Medical Association convention at Chicago in 1948. It consists of an ampoule of the solution for injection, under pressure of an inert gas, connected by flexible transparent tubing to a needle with a glass cover. To make an injection, the cover is removed and the needle inserted into the selected site with the usual antiseptic precautions. (If a vein is accidentally entered, blood will flow into the tubing when this is pinched and released.) The tip of the ampoule is then snapped by bending the transparent tubing, and the pressure of the gas forces the solution through the needle. The whole process, it is claimed, is considerably quicker than ordinary methods of injection, and in addition it ensures accuracy of dosage and maximum sterility. Syringe-transmitted hepatitis is avoided, since each ampin is used once only—which, incidentally, means that patients have a sharp new needle for each injection. The possibility of glass fragments passing down the needle has been investigated, and we understand that the risk may be discounted. The method is specially suitable for general practitioners, district nurses, and midwives, and the ease of administration will be attractive to busy anæsthetists. Intravenous infusions of saline and plasma can also be given in the same way.

The British representatives say that the ampin is actually cheaper to use than the traditional syringe. Preliminary figures which they have obtained from hospitals with a central syringe service indicate an over-all cost, including maintenance and renewal, of about 9*d.* per injection. One ampin, on the other hand, can be bought by hospitals for rather less than 7½*d.*; and the labour and expense of servicing are, of course, eliminated. Both these figures are exclusive of the cost of the the drug.

The manufacturers and distributors in this country are Cuxson Gerrard & Co. Ltd., Fountain Lane, Oldbury, Birmingham.

1. The Scalpel, the Sword: The Story of Norman Bethune. By SYDNEY GORDON and TED ALLAN. London: Robert Hale. 1954. Pp. 271. 16*s.*
2. Gottfried, O. *N.Y. Physician*, September, 1953.
3. Batterman, R. C., Rovenstine, E. A. *J. Lab. clin. Med.* 1950, **35**, 795.

FILMS ON DENTAL EMERGENCIES

MOST medical graduates are required to enter one of the three Services shortly after registration, and sooner or later many of them—particularly those who join the Royal Navy—find themselves dealing unaided with dental emergencies. For this reason, the Admiralty has issued a series of colour films and film-loops which show in detail the measures which may be used to tide patients over until they can be seen by a dentist.

Three of the longer films describe dental inflammatory conditions, operative techniques (including local anæsthesia and the treatment of postoperative pain and bleeding), and the management of injuries to the teeth and jaws. Nine short film-loops in colour have also been prepared, each showing the extraction of a tooth. All illustrate clearly, by means of diagrams, models, and practical demonstrations, the essentials of diagnosis and treatment of inflammatory and traumatic dental lesions. The commentaries are good, the exposition is unhurried, and important details are suitably emphasised.

These films were designed originally for Naval doctors, but the Admiralty suggests that they might also be helpful to senior medical students. The films will shortly be available, for hire or purchase, from the director of Naval training at the Admiralty.

University of Birmingham

On Dec. 17 the following degrees were conferred:

Ph.D. (in the faculty of medicine).—D. M. Edward.

M.B., Ch.B.—Yaw Asirifi, P. H. Astill, Joyce E. Bailey, Patricia A. Bramley, John Bullock, E. P. C. Hadley, Olga R. Harbron, Ella E. L. Holt, J. W. P. Jarrams, David Learmont, A. P. Mayne, E. T. Melley, W. K. Merifield, Kenneth Middleton, J. D. Nicholas, P. A. North, L. J. T. Pearson, A. Sutherland, Elizabeth M. Tilsen, Derek Wright, R. A. Yeomans.

University of Bristol

In recent examinations the following were successful:

M.D.—A. G. W. Branch.

M.B., Ch.B.—H. T. Apsimon, Pamela M. Atkinson, P. H. Barry, Catherine A. Clark, K. G. Collins, D. J. C. Felton, J. H. L. Griffin, M. L. Harvey, J. K. Howell, Antoinette R. Joseph, J. McC. Laitoo, Jean D. Matthews, T. N. Matthews, J. H. Orr, B. K. Palmer, B. A. Poley, E. C. Skeens.

University of Durham

On Dec. 18 the degrees of M.B., B.S., were conferred on the following:

A. L. Brown, P. J. Burnett, Mary Campbell, * Fook Kwee Chai, J. R. Clark, J. F. Colville, G. S. Cowin, Joan A. Davison, Francis Duran, Florence Farrow, J. F. Fenby, A. L. Ferguson, William Granger, C. B. Hackett, Susan E. A. Hart, N. C. Haswell, C. A. Nutt, Bridget A. W. Osselton, Sydney Phinn, P. F. W. Rowell, Jean C. Russell, Elizabeth J. Studdy, Foster Thompson, B. R. Tindle, S. V. J. Watson, Pamela Willis.

* In absentia.

University of Liverpool

At recent examinations the following were successful:

M.D.—E. F. B. Cadman, B. R. Frisby, S. Gillis, G. Hughes, D. E. Paterson, G. W. Storey, E. H. Wilson.

M.Ch.Orth.—B. S. Jones, M. A. Vall.

M.B., Ch.B.—J. D. Agnew, J. A. Barlow, I. K. Brown, B. J. Charlick, G. O. Dubourg, T. R. Evans, Patricia O. Grundy, P. A. Harrison, T. R. T. Hughes, R. A. Johnson, J. L. Mason, W. V. N. Pugh, Mary E. Shepherd, D. Taylor-Robinson, R. A. Yorke.

D.M.R.T. (Part II).—P. K. Ganguli.

D.T.M.&H.—B. A. Chaudhary, J. Ghosh, June H. Green, B. A. Johnson, A. J. Jones, G. P. Lowther, M. L. Magotra, A. M. Maiden, B. C. Onyeabo, D. J. Patel, B. Prasad, C. I. Somaya, J. K. N. Yearsley.

The Milne medal in tropical medicine has been awarded to Dr. G. P. Lowther.

Royal Faculty of Physicians and Surgeons

At a meeting of the council on Dec. 21 with Prof. Stanley Graham, the president, in the chair, the following were admitted to the fellowship:

Jasoda Jiban Das, J. A. Rundle, W. C. Watson.

Royal Society

Locke research fellowships have been awarded to:

Dr. M. de Burgh Daly to work on carotid sinus reflexes and haemodynamics of the pulmonary circulation, at University College, London.

Dr. J. C. F. Poole to work on the effects of fat absorption and blood coagulation and thrombosis, at the Sir William Dunn School of Pathology, Oxford.

University of Sheffield

Mr. O. Daniel has been appointed senior lecturer in surgery, and Dr. D. Balducci research assistant in bacteriology and virus diseases.

University of Edinburgh

On Dec. 17 the following degrees were conferred:

M.D.—G. S. Kilpatrick, * J. W. Lusk, † G. M. Maxwell.
Ph.D. (in the faculty of medicine).—A. N. George, Sourindra Mohan Ghosh, I. A. Macpherson, D. I. Nisbet.
M.B., Ch.B.—A. J. Bennet, A. A. H. Brown, J. A. Brown, C. F. M. Caird, P. G. Coffey, R. W. Davidson, H. P. Davie, G. F. Davis, P. G. Drummond-Smith, W. D. Fanner, Alan Ford-Hunter, D. A. K. Geldenhuys, H. C. R. Hinwood, P. Y. Kyle, M. H. Lea, Kian Poen Lim, A. G. Mackinnon, D. G. Mechie, Denis Moore, * Sheila M. L. Moore, D. R. Oliver, W. F. Parrott, Shirley A. Peacock, W. H. Rabie, J. L. Smith, A. T. Thomason, R. A. P. Whitelaw, John Wood, I. F. Young.
* In absentia. † Highly commended.

The following diplomas have been awarded:

D.P.H.—D. F. Baxter.
D.M.R.-D.—W. N. Boyd, R. F. Cant, J. H. Greig, A. H. Morris, A. A. Wild.
D. Psych.—J. G. Henderson, P. J. Zeck.

The George Guthrie research fellowship in child health was awarded to Dr. J. F. J. Collins, and the Hastilow research scholarship in rheumatism was awarded to Dr. W. R. M. Alexander.

Royal College of Surgeons of Edinburgh

At a meeting of the college on Dec. 15, with Prof. Walter Mercer, the president, in the chair, the following were admitted to the fellowship:

W. A. Baker, G. T. F. Braddock, Guru Kripa Chaudhuri, J. N. de Klerk, C. J. Dewhurst, J. B. Doss, J. M. du Toit, Mourad Mahmoud El Fiki, Harry Fine, W. D. Graham, J. J. Ironside, A. J. A. McCormick, G. T. Mair, K. P. P. B. Menon, M. J. Meter, Durga Prasad Misra, G. F. Murnaghan, Bhalchandra Vasudeo Nabar, Jagdish Swarup Pathak, James Piggot, Nukalapati Balakrishna Reddy, W. C. Robinson, Roy Shree Krishna, Pramod Karan Sethi, Gajendra Sinh, R. G. D. Taylor.

Royal Sanitary Institute

Fellowships have been conferred on:

Dr. J. C. R. Buchanan, Colonel P. J. L. Capon, Dr. Archibald Dodd, and Dr. William Hogg.

University of New Zealand

Mr. H. M. Carey, who has been acting professor since Prof. Spence Smyth resigned early this year, has been appointed to the postgraduate chair in obstetrics and gynæcology at Auckland University College. The appointment carries also the medical directorship of the National Women's Hospital under the Auckland Hospital Board.

Professor Carey was born in New Zealand and graduated M.B. at the University of Sydney in 1941, having held a part-time lectureship in physiology and biochemistry. After holding resident posts at the Royal Hospital for Women, Sydney, and Queen's Park Hospital, Blackburn, Lancashire, he spent four years as senior registrar in obstetrics and gynæcology at the Postgraduate Medical School of London. He also spent a year in the department of obstetrics at Johns Hopkins Hospital. From 1943 to 1945 he served in the R.A.A.F. as officer commanding No. 1 Aviation Medicine Section. He began work in New Zealand as assistant in the professorial unit early in 1954. He has published papers on the use of ion-exchange resins, oxytocics, and fœtal distress.

McGill University, Montreal

Dr. W. Clifford M. Scott has been appointed associate professor in the department of psychiatry to organise facilities for training in psycho-analysis.

Dr. Scott graduated from the University of Toronto in 1927. After working under Prof. Adolf Meyer and Prof. Macfie Campbell, he continued his studies in London at the National Hospital, Queen Square, and the Institute of Psycho-analysis, taking the D.P.M. in 1934. He later became director of the Clinic of Psycho-analysis in London, and during the late war was a psychiatrist in the E.M.S. He is a member of the staffs of the Institute of Psychiatry and of the Bethlem Royal and Maudsley Hospital, London. He is also an assistant editor of the *International Journal of Psycho-analysis* and president of the British Psycho-Analytical Society.

E.E.G. Society

A meeting of this society will be held at 10.30 A.M. on Saturday, Jan. 8 at the National Hospital, Queen Square, London.

London County Medical Society

The annual dinner of this society will be held at the Talbot Restaurant, 64, London Wall, E.C.2, on Tuesday, Jan. 18, at 7.30 P.M., when Dr. Robert Forbes, secretary of the Medical Defence Union, will speak on medical litigation. Tickets (11*s.* 6*d.*) may be had from Dr. A. M. Ramsay, Royal Free Hospital, Lawn Road, N.W.3.

Exhibition of Israeli Scientific Publications

This exhibition, which is being held at the Consulate of Israel, 18, Manchester Square, London, W.1, is to remain open until Jan. 7.

Association of Clinical Biochemists

Southern Region.—The annual general meeting of this region is to be held at University College Hospital, London, W.C.1, on Monday, Jan. 10, at 3.15 P.M. At 4.30 P.M. scientific papers will be read.

Institute of Diseases of the Chest, London

Clinical demonstrations on chest disease are given on Fridays at 5 P.M. at this institute (in the grounds of the Brompton Hospital, Fulham Road, S.W.3). They are open without fee to doctors. The next series will begin on Jan. 7 and end on April 1.

Colonial Work of the N.A.P.T.

The National Association for the Prevention of Tuberculosis has presented to the secretary of State a memorandum on the association's activities in Colonial territories. Over the past nine years this association's work in backward areas has included large-scale health propaganda, and the provision of well-trained professional teams. By means of N.A.P.T. scholarships, 55 doctors, nurses, and sanitary workers, from 18 Colonies, have been enabled to come to Britain for study. The memorandum drew attention to the Colonies' need for more tuberculosis specialists and greater research facilities, and indicated the association's willingness to assist the Colonial Office in overcoming the pressing problem of tuberculosis among immigrants to Britain from the Colonies.

CORRIGENDUM: *Scottish Appointment.*—Dr. C. J. Swanson is chairman of the General Medical Services Subcommittee (Scotland), and not of the Scottish Health Services Council as we incorrectly stated last week (p. 1336). Captain J. P. Younger is chairman of the council.

Sir Lionel Whitby is to be visiting professor of medicine at the New York State University College of Medicine in January.

The Wellcome Historical Medical Museum has moved from Portman Square, London, W.1, to the Wellcome Research Institution, 183, Euston Road, N.W.1. Exhibitions dealing with primitive medicine and with child welfare through the ages are open to the public in the new premises (Monday to Friday, 10–5).

Diary of the Week

JAN. 2 TO 8

Monday, 3rd

INSTITUTE OF NEUROLOGY, The National Hospital, Queen Square, W.C.1
5 P.M. Sir Geoffrey Jefferson, F.R.S.: Benign and Malignant Tumours of the Gasserian Ganglion.

Tuesday, 4th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
3.45 P.M. Dr. G. D. Lumb: Pathological Aspects of Ulcerative Colitis. (Erasmus Wilson demonstration.)
INSTITUTE OF DERMATOLOGY, St. John's Hospital, Lisle Street, W.C.2
5.30 P.M. Dr. L. Forman: Skin Lesions with Deeper Significance.

Wednesday, 5th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.15 P.M. *History of Medicine.* Miss Jessie Dobson: William Clift. Dr. Norah Schuster: Dr. Isaac Buxton.
8 P.M. *Surgery.* Mr. H. T. Simmons, Dr. C. J. Gavey, Prof. Norman Dott, Dr. G. F. Abercrombie: Palliation in Cancer.
INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. H. Haber: Parapsoriasis, Poikiloderma, and Mycosis Fungoides.
MEDICO-CHIRURGICAL SOCIETY OF EDINBURGH
8.30 P.M. (Royal College of Surgeons, 18, Nicolson Street. Dr. W. I. Card, Mr. John Bruce: Ulcerative Colitis.

Thursday, 6th

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5 P.M. Mr. J. M. Potter: Angiomatous Malformations of the Brain. (Hunterian lecture.)
ROYAL SOCIETY OF MEDICINE
8 P.M. *Neurology.* Sir Francis Walshe, F.R.S.: The Future of Neurology.
ROYAL ARMY MEDICAL COLLEGE, Millbank, S.W.1
5 P.M. Miss Muriel Robertson, F.R.S.: Sir David Bruce—an Appreciation of the Man and his Work.

Friday, 7th

ROYAL SOCIETY OF MEDICINE
5.30 P.M. *Anæsthetics.* Prof. E. A. Pask: Maintenance of Respiration in Respiratory Paralysis.
INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. J. E. M. Wigley: Psoriasis. (Clinical demonstration.)
ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street, Glasgow
5 P.M. Dr. I. Anderson: Electrolyte Balance.

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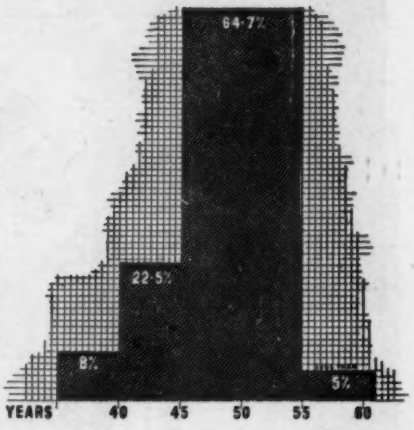

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The examination will take the form of a self-chosen essay and an interview. Further particulars to be obtained from the Deputy Regius Professor of Medicine, University Museum, Oxford.

All applications, with essays, must be sent in by 31st January, 1955.

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Monday, 21st February
9.30 A.M.—Paroxysmal Tachycardia—Dr. GRAHAM HAYWARD
11 A.M.—Rheumatic Heart Disease I—Dr. WILLIAM EVANS
2 P.M.—Outpatient Clinic—Dr. GRAHAM HAYWARD
Tuesday, 22nd February
10.15 A.M.—Outpatient Clinic—Dr. AUBREY LEATHAM
2 P.M.—Outpatient Clinic—Dr. PAUL WOOD
Wednesday, 23rd February
10.15 A.M.—Outpatient Clinic—Dr. WALLACE BRIGDEN
2 P.M.—Outpatient Clinic—Dr. MAURICE CAMPBELL
Thursday, 24th February
9.30 A.M.—Congenital Heart Disease I—Dr. MAURICE CAMPBELL
11 A.M.—Common Errors in Diagnosis—Dr. EVAN BEDFORD
2 P.M.—Outpatient Clinic—Dr. EVAN BEDFORD
Friday, 25th February
9.30 A.M.—Heart Failure—Dr. AUBREY LEATHAM
11 A.M.—Angina Pectoris—Dr. PAUL WOOD
2 P.M.—Outpatient Clinic—Dr. WILLIAM EVANS
Monday, 28th February
9.30 A.M.—Bacterial Endocarditis—Dr. GRAHAM HAYWARD
11 A.M.—Rheumatic Heart Disease II—Dr. WILLIAM EVANS
2 P.M.—Outpatient Clinic—Dr. GRAHAM HAYWARD
Tuesday, 1st March
10.15 A.M.—Outpatient Clinic—Dr. AUBREY LEATHAM
2 P.M.—Outpatient Clinic—Dr. PAUL WOOD
Wednesday, 2nd March
10.15 A.M.—Outpatient Clinic—Dr. WALLACE BRIGDEN
2 P.M.—Outpatient Clinic—Dr. MAURICE CAMPBELL
Thursday, 3rd March
9.30 A.M.—Congenital Heart Disease II—Dr. MAURICE CAMPBELL
11 A.M.—Hypertension—Dr. WALLACE BRIGDEN
2 P.M.—Outpatient Clinic—Dr. EVAN BEDFORD
Friday, 4th March
9.30 A.M.—Cardiac Infarction—Dr. PAUL WOOD
11 A.M.—Clinical Discussion : "Any Questions ? "—Dr. EVAN BEDFORD
2 P.M.—Outpatient Clinic—Dr. WILLIAM EVANS

The fee for the course is 12 guineas.

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330/332, Gray's Inn-road, London, W.C.1

COMPLETE CLINICAL COURSE (whole-time) especially suitable for D.L.O. Part II students ; 3RD JANUARY–10TH JUNE, 1955. Fee £31 10s.

INTENSIVE CLINICAL COURSE (whole-time) 31ST JANUARY–26TH FEBRUARY, 1955. This course covers the whole field of the specialty and is intended to form a theoretical basis in preparation for practical clinical training. Fee £12 12s.

BASIC SCIENCES CLASS (whole-time) for Part I D.L.O. students, with facilities for dissection ; 21ST FEBRUARY–27TH MAY, 1955. Fee £21.

WEEK-END COURSE IN AURAL SURGERY for senior students and practising members of the specialty ; 21ST, 22ND, and 23RD JANUARY, 1955. Fee £5 5s.

ADVANCED REVISION COURSE for Final F.R.C.S. students ; 7TH FEBRUARY–23RD APRIL, 1955. Arranged as part-time course (mostly evenings) to meet circumstances of students holding appointments. Fee £21.

Detailed syllabus obtainable from the Dean.

MARLBOROUGH DAY HOSPITAL

38, Marlborough-place, N.W.8

General Practitioners and Professional People working in the Mental Health Field are invited to LECTURES held at the above on the first MONDAY in every month at 8.15 P.M.

On MONDAY, 3RD JANUARY, Dr. H. J. SHORVON will speak on : "Abreactive Treatments, especially in relation to Psychosomatic Disorders."

INSTITUTE OF CARDIOLOGY. (British Postgraduate MEDICAL FEDERATION, UNIVERSITY OF LONDON.) (Associated with the National Heart Hospital, Westmoreland-street, W.1.) Applications are invited for the post of ASSISTANT DIRECTOR (full-time). Salary scale corresponding to that of Reader (£1500–£100–£2000) with family allowances and superannuation under the F.S.S.U. Duties will consist of research, teaching, and care of beds and an outpatient clinic. The appointment will be for 3 years in the first instance, subject to annual confirmation, and may thereafter be renewed by annual reappointment.

Further information may be obtained from the Dean at 35, Wimpole-street, W.1, to whom applications, together with the names of 3 referees, should be sent not later than 30th January, 1955.

UNIVERSITY OF LONDON. Applications are invited for I.C.I. RESEARCH FELLOWSHIPS in Biochemistry, Chemistry, Chemotherapy, Engineering, Metallurgy, Pharmacology, Physics or allied subjects, tenable from 1st October, 1955, normally for 3 years in the first instance. Salary not less than £750 p.a. with family allowances and F.S.S.U.

Information and application forms can be obtained from the Academic Registrar, University of London, Senate House, W.C.1. Applications must be received not later than 16th April, 1955.

UNIVERSITY OF LONDON. Applications are invited for TURNER AND NEWALL RESEARCH FELLOWSHIPS in Engineering, Inorganic Chemistry, Physics or an allied subject, tenable from 1st October, 1955, normally for 3 years in the first instance. Salary not less than £750 p.a. with family allowances and F.S.S.U.

Information and application forms can be obtained from the Academic Registrar, University of London, Senate House, W.C.1. Applications must be received not later than 16th April, 1955.

UNIVERSITY OF DURHAM. United Newcastle upon TYNE HOSPITALS. Applications are invited for the post of PROFESSOR OF CHILD HEALTH. The post will carry with it an appointment of Consultant status as Honorary Physician in the Teaching Hospital Group. Salary in accordance with the scale for Clinical Professors with family allowances and F.S.S.U.

Further particulars may be obtained from the undersigned, with whom 20 copies of applications containing names of 3 persons to whom reference may be made, should be lodged not later than 5th February, 1955. Candidates outside the British Isles may submit 1 copy only.

E. M. BETTENSON, Registrar.
University Office, 46, North-bailey, Durham.

UNIVERSITY OF EDINBURGH. Applications are invited for the appointment of SENIOR LECTURER in the Department of Child Life and Health. The successful applicant will be given Honorary Consultant status by the South-Eastern Regional Board, and hold an appointment as Associate Physician to the Royal Hospital for Sick Children, Edinburgh, with clinical responsibilities within the professorial charge. Salary (presently under review) in the range of £1500–£2000 p.a., according to qualifications and experience, with superannuation benefit and family allowance where applicable.

Further particulars may be obtained from the undersigned with whom applications, giving the names of 3 referees, should be lodged not later than 22nd January, 1955.

CHARLES H. STEWART, Secretary to the University.

THE UNIVERSITY OF MANCHESTER. Applications are invited from candidates with medical qualifications registrable in this country for the post of LECTURER IN OPHTHALMOLOGY. The successful candidate will be expected to carry out research in the University Department of Ophthalmology at the Manchester Royal Eye Hospital and to assist in the clinical work of this unit. Salary on a scale rising to £1800 p.a. (salary scales at present under review), with membership of F.S.S.U. and Children's Allowance Scheme : initial salary according to qualifications and experience.

Applications should be sent not later than 5th February, 1955, to the Registrar, the University, Manchester, 13, from whom further particulars and forms of application may be obtained.

THE UNIVERSITY OF LEEDS—UNITED LEEDS HOSPITALS. Applications are invited for appointment as SENIOR REGISTRAR AND TUTOR IN MEDICINE at a salary on the scale £1000–£100–£1400 a year.

Applications (3 copies), stating date of birth, qualifications, details of present and previous appointments with dates, and experience of teaching, together with the names of 3 referees, should reach the Registrar, The University, Leeds, 2 (from whom further particulars may be obtained), not later than 1st February, 1955.

Hospital Services : Senior Appointments

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

(1) Whole-time ASSISTANT PHYSICIAN in Physical Medicine, Medical Rehabilitation Centre, Camden-road, N.W.1. The Centre is designed for outpatient rehabilitation of the long-term traumatic case, and conservation of function in chronic disorders. Applicants should be experienced in rehabilitation. Centre may be visited by direct appointment. Salary £1500 (unless below age 32)–£1950.

Applications by 9th February, 1955.

(2) CONSULTANT PSYCHOTHERAPIST, 4 half-days a week, Portman Clinic, 8, Bourdon-street, W.1. Duties mainly concerned with adolescent and adult delinquents and social problem cases. Some evening sessions. Research interests and experience of analytic and group therapy will be an advantage. Clinic may be visited by direct appointment.

Applications by 7th February, 1955.

(3) CHILD PSYCHIATRIST (Senior Hospital Medical Officer), 6 half-days a week, Child Guidance Clinic, 58, Hampton-road, Twickenham. Clinic may be visited by appointment with Area Medical Officer, Elmfield House, High-street, Teddington.

Applications by 11th February, 1955.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited to fill a vacancy for a Whole-time ASSISTANT PATHOLOGIST to the Greenwich and Deptford and Seamen's Groups of hospitals. Candidates must have had general experience in pathology and possession of a higher qualification is desirable. Salary within the scale £1500–£50–£1950.

Apply, stating nationality, age, qualifications and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 15th January, 1955.

ST. MARY'S HOSPITAL, W.2. Applications are invited, for the post of Part-time ASSISTANT RADIOTHERAPIST (Senior Hospital Medical Officer), from candidates holding the Diploma in Radiology. The successful candidate will be required to undertake 3 notional half-days per week, and to commence duties as soon as possible.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of present and previous appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, by 6th January, 1955.

BATH CLINICAL AREA. South-Western Regional HOSPITAL BOARD. Applications are invited from registered medical practitioners for the appointment of a CONSULTANT SURGEON to the Bath Clinical Area which comprises Bath, North East Somerset, Mid and West Wilts. The appointment may be held either on a whole-time or maximal (9 sessions) part-time basis. Applicants should have had wide experience in general surgery. The successful candidate will have charge of beds at the Royal United Hospital and at St. Martin's Hospital, Bath, and will be required to visit other hospitals in the Clinical Area as may be determined by the Regional Board from time to time.

Applications (12 copies), stating date of birth, qualifications and experience together with 12 copies of 2 testimonials, and the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 22nd January, 1955.

NEW ZEALAND. WAIKATO HOSPITAL BOARD, HAMILTON, NEW ZEALAND. Applications are invited from qualified medical practitioners of the British Empire, possessing a Diploma in Diagnostic Radiology, for the position of ASSISTANT RADIOLOGIST. Salary in accordance with the hospital employment regulations and within the range of £NZ1353–£NZ1653 p.a. for a Junior Specialist and £NZ1753–£NZ2253 p.a. for a Senior Specialist. Conditions of appointment, accompanying explanatory memorandum and form of application obtainable from the High Commissioner for New Zealand, 415, Strand, London, W.C.2, quoting reference No. 3/6/19 and mentioning this journal.

Completed applications close in New Zealand on 11th March, 1955, and must reach the High Commissioner's Office, London, not later than 25th February, 1955.

NEWFOUNDLAND PROVINCIAL DEPARTMENT OF HEALTH. HOSPITAL FOR MENTAL AND NERVOUS DISEASES, ST. JOHN'S, NEWFOUNDLAND. A qualified PSYCHIATRIST is required to work in an outpatient clinic and day treatment centre at the above 900-bed Hospital. The self-contained Outpatient Department is in the main building, and the clinic, in addition to carrying out day treatment, performs a Consultant Service for general practitioners and governmental agencies. Salary is $7000 p.a., and the appointee must provide his own accommodation. Passage will be paid to St. John's.

Applications, with full details, should be forwarded to C. H. POTTLE, M.D., Superintendent, Hospital for Mental and Nervous Diseases, St. John's, Newfoundland, Canada.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Locum Tenens SENIOR HOSPITAL MEDICAL OFFICER or CONSULTANT in Radiotherapy (9 sessions weekly) required for the Portsmouth Group of hospitals from 6th to 27th February, 1955. Remuneration in accordance with the terms and conditions of service of hospital medical staff.

Applications by 14th January to Area Secretary, South West Metropolitan Regional Hospital Board, Highcroft, Romsey-road, Winchester.

AUSTRALIA. ROCKHAMPTON HOSPITAL, QUEENSLAND, AUSTRALIA. Part-time MEDICAL OFFICERS. Applications in writing are invited for appointment for 3 years to the following part-time specialist appointments at the Rockhampton Hospital.

Physician : 1 session of 3 hours per week divided into an outpatient session of 2 hours, and an inpatient session of 1 hour. Salary £290 p.a.

E.N.T. : 1 outpatient session of 3 hours per week and 1 inpatient session of 3 hours per week. Salary £580 p.a.

Rockhampton has a population of 40,000 and is the centre of a district of 90,000 in population. Further particulars will be forwarded upon request. Appointees to be not over 60 years of age.

Applications should be addressed to the Secretary, Rockhampton Hospitals Board, Rockhampton, Queensland. Applications close 3rd February, 1955.

Hospital Services : Junior Appointments

ANNIE McCALL MATERNITY HOSPITAL, Jeffrey's-road, S.W.4. Applications are invited from registered Women medical practitioners for the post of RESIDENT OBSTETRIC HOUSE SURGEON (post recognised for the D.Obst.R.C.O.G.). Appointment is for a period of 6 months and is vacant on 1st February, 1955.

Applications, stating age, qualifications with dates and nationality accompanied by copies of 3 recent testimonials, should be sent to the Secretary, Lambeth Group Hospital Management Committee, Renfrew-road, S.E.11.

BETHNAL GREEN HOSPITAL, Cambridge Heath-road, London, E.2. (General—309 Beds.) Applications are invited for the posts of 3 HOUSE PHYSICIANS. Recognised pre-registration posts.

Applications, stating age, qualifications, nationality, and experience, with copies of 2 recent testimonials, to the Hospital Secretary, as soon as possible.

BRITISH HOSPITAL FOR MOTHERS AND BABIES, Samuel-street, Woolwich, S.E.18. OBSTETRICAL HOUSE OFFICER, vacant 1st February. Recognised for D.Obst.R.C.O.G. and M.R.C.O.G. Approved for Pre-registration Service.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of OBSTETRIC HOUSE SURGEON (recognised for the M.R.C.O.G.). Duties to commence 1st March, 1955. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, to be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 12th January, 1955.

FULHAM HOSPITAL, St. Dunstan's-road, Hammersmith, W.6. FULHAM AND KENSINGTON HOSPITAL MANAGEMENT COMMITTEE. Qualified medical practitioners, including pre-registration candidates, are invited to apply for the following vacancies :—

HOUSE PHYSICIAN (3 vacancies).

HOUSE SURGEON (2 vacancies). Appointments recognised for F.R.C.S.

Appointments commence 1st February, 1955, are resident and limited to 6 months.

Applications to be submitted by 12th January, 1955, on forms obtainable from the Hospital Secretary (L.54).

FULHAM HOSPITAL, St. Dunstan's-road, Hammersmith, W.6. FULHAM AND KENSINGTON HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE SURGEON to the Orthopædic Department. Resident post. Vacant 1st February, 1955. Post recognised for F.R.C.S. Candidates may visit the Hospital by arrangement with the Hospital Secretary.

Applications to be submitted by 12th January, 1955, on forms obtainable from the Hospital Secretary (L.59).

GREENWICH AND DEPTFORD AND SEAMEN'S HOSPITAL GROUPS. SENIOR HOUSE OFFICER in Pathology required for duties in the above Groups. Resident on premises or in immediate neighbourhood. Tenable for not less than 1 year.

Applications, stating age, qualifications and previous experience, with names of 2 referees, on or before 15th January to the undersigned, who will supply further particulars and make appointments for candidates to visit laboratories.

F. A. LYON, Secretary.

Dreadnought Seamen's Hospital, Greenwich, S.E.10
(Tel. GRE 3433).

GUY'S HOSPITAL AND SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited to fill an established vacancy as SENIOR REGISTRAR in Obstetrics until 30th September, 1956. The appointment will be made jointly by the bodies concerned and will be held in the first instance, until 30th September, 1955, in the Regional Hospital in the Bromley Group and will be renewable for the year commencing on 1st October, 1955, at Guy's Hospital until 30th September, 1956. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Forms of application are obtainable from, and should be lodged with, the Superintendent, Guy's Hospital, S.E.1, not later than 7th January, 1955.

HACKNEY HOSPITAL, London, E.9. (842 Beds.) Applications for appointment of Pre-registration HOUSE SURGEON for 6 months from 1st February should be sent to Group Secretary at above address by 10th January, quoting HHP/HS. Post recognised for F.R.C.S.

HAMMERSMITH HOSPITAL AND INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY, Ducane-road, London, W.12. HOUSE OFFICER (gynæcology) required 1st March. Recognised for M.R.C.O.G.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, Board of Governors, by 15th January.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. ANÆSTHETIST (House Officer grade), resident, required. 100 active surgical and orthopædic beds, approximately 1200 operations annually.

Applications, with copies of 3 testimonials, to Hospital Secretary.

HOSPITAL FOR WOMEN, Soho-square, W.1. (Affiliated to the Middlesex Hospital.) Applications are invited for a full-time post of RESIDENT SENIOR GYNÆCOLOGICAL HOUSE OFFICER, vacant on 1st April, 1955. Appointment is for 6 months but the holder can apply for an extension of 6 months. Salary in accordance with the terms laid down for medical and dental staffs, less a deduction of £125 p.a. for residential emoluments. The appointment is recognised for the M.R.C.O.G. examination.

Applications, stating age, nationality, qualifications, and experience, supported by the names and addresses of 2 referees, must reach the undersigned not later than Wednesday, 19th January. D. C. EMERY, Secretary.

LAMBETH HOSPITAL, Kennington, S.E.11. Applications are invited from pre-registration and registered medical practitioners for the position of RESIDENT HOUSE PHYSICIAN, vacant on 1st February, 1955.

Application forms from the Physician-Superintendent at the Hospital (enclosing stamped addressed envelope).

LANGTHORNE HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the resident post of HOUSE OFFICER in the Group Geriatric Unit at above Hospital, which falls vacant on 26th February, 1955. The post offers excellent scope for persons interested in this specialty as the most modern methods of geriatric treatment are employed, supervised by a Consultant Geriatrician, with full consultant services in other branches.

Application forms from the Senior Medical Officer, Langthorne Hospital, London, E.11, to be returned by not later than 20th January, 1955.

LONDON CHEST HOSPITAL. Hospitals for Diseases of THE CHEST. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in the Tuberculosis Dispensary at the Hospital. Experience in diagnosis and treatment of tuberculosis essential.

Applications, stating age, qualifications with dates, and previous appointments held with copies of 3 testimonials, should be sent to the undersigned by 22nd January, 1955.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of SENIOR HOUSE OFFICER to the Department of Anæsthetics becoming vacant on 1st March, 1955.

Applications (6 copies), together with 6 copies of 3 recent testimonials, should be received by the House Governor by 15th January, 1955. H. BRIERLEY, House Governor.

LONDON HOSPITAL, Whitechapel, E.1, AND THE NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR REGISTRAR in General Medicine. A higher qualification in medicine is required. The appointment will be for 1 year, renewable for a maximum of 4. The first 2 years will be spent at The London Hospital and part or the whole of the remainder with the Forest Group of hospitals based on the Connaught Hospital.

Applications (12 copies), giving the names and addresses of 3 referees, should be received by the House Governor by 31st January, 1955. H. BRIERLEY, House Governor.

MARIE CURIE HOSPITAL, 66, Fitzjohn's-avenue, Hampstead, N.W.3. Applications are invited from registered medical practitioners for the post of GYNÆCOLOGICAL HOUSE SURGEON (radiotherapy). Vacant 15th January, 1955.

Applications, with copies of testimonials, to the Medical Director.

MILE END HOSPITAL, Bancroft-road, E.1. (475 Beds.) HOUSE SURGEON (pre-registration, or first, second, or third). Required for duty on 1st February, 1955.

Application forms obtainable from Physician-Superintendent, to be returned by 19th January, with copies of not more than 3 testimonials.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of ASSISTANT HOUSE PHYSICIAN (non-resident) at The National Hospital, Queen-square, W.C.1. This post carries the grade of Senior House Officer. The appointment will be for 6 months.

Applications, with names of 3 referees, to be sent to the undersigned not later than 22nd January, 1955.

H. EWART MITCHELL, Secretary.

The National Hospital, Queen-square, W.C.1.

NELSON HOSPITAL, Kingston-road, Merton, S.W.20. HOUSE SURGEON (resident), vacant 5th February, 1955. Post recognised for F.R.C.S.

Applications, stating age, qualifications, &c., with the names and addresses of 2 referees, should be sent to the Secretary at above address.

NELSON HOSPITAL, Kingston-road, Merton, S.W.20. HOUSE SURGEON (resident), approved pre-registration post, vacant 5th February, 1955.

Applications, stating age, qualifications, &c., with the names and addresses of 2 referees, should be sent to the Secretary at above address.

NORTH EAST METROPOLITAN REGIONAL HOS-PITAL BOARD.

(1) REGISTRAR in Obstetrics and Gynæcology (non-resident—resident when on duty), Chase Farm Hospital and other hospitals in the Enfield Group, Middlesex. Recognised for M.R.C.O.G.

(2) REGISTRAR in Obstetrics and Gynæcology (resident), St. Andrew's Hospital, Billericay, Essex.

(3) SURGICAL REGISTRAR (non-resident), Whipps Cross Hospital, Leytonstone, E.11.

(4) ANÆSTHETIC REGISTRAR (non-resident), Prince of Wales's General Hospital and other hospitals in the Tottenham Group, Tottenham, N.15. Recognised for F.F.A.R.C.S.

(5) REGISTRAR in Pathology (resident), General Hospital, Rochford, Essex. Recognised for D.Path.

(6) REGISTRAR in Pathology (resident), St. Ann's General Hospital, Tottenham, N.15.

Appointments subject to review after 1 year.

Separate applications in duplicate, with 2 copies of 2 recent testimonials, to Secretary, 11A, Portland-place, W.1, by 15th January, 1955.

PADDINGTON GENERAL HOSPITAL, Harrow-road, W.9. (564 Beds.) Applications are invited for the post of REGISTRAR (general medicine), whole-time, non-resident, commencing 1st March, 1955. Opportunity given for experience in all branches of ward and outpatients medical work and the teaching of Medical Students of St. Mary's Hospital Medical School. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, the Secretary to Committee, Paddington General Hospital, Harrow-road, W.9, by 15th January, 1955.

PLAISTOW HOSPITAL, Samson-street, Plaistow, London, E.13. (185 Beds.) Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN (pre-registration second post) for 6 months commencing 5th February, 1955, in the Chest Unit and Infectious Diseases Unit at this Hospital. The position offers valuable experience in both groups of diseases and is particularly useful to candidates sitting for the M.R.C.P. examinations.

Applications to M. J. HUNTLEY, Group Secretary, West Ham Group Hospital Management Committee, Stratford, London E.15, by 5th January, 1955.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. QUEEN CHARLOTTE'S MATERNITY HOSPITAL. JUNIOR OBSTETRIC OFFICER (Senior House Officer). Resident post tenable for 6 months from 1st April, 1955.

Applications to the Secretary to the Board of Governors by 17th January, 1955, on forms obtainable from 339, Goldhawk-road, London, W.6.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. CHELSEA HOSPITAL FOR WOMEN. HOUSE SURGEON (Senior House Officer). Resident post tenable for 1 year from 1st April, 1955.

Applications to the Secretary to the Board of Governors by 17th January, 1955, on forms obtainable from 339, Goldhawk-road, London, W.6.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE, Hackney-road, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. HOUSE OFFICER. This appointment will be made for 2 periods of 6 months commencing 1st March, 1955. First appointment as House Physician and second as House Surgeon and Casualty Officer.

Application forms may be obtained from the Secretary at Hackney-road and should be returned with copies of not more than 3 testimonials on or before 17th January, 1955.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE, Hackney-road, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. Applications are invited for the appointment of RESIDENT MEDICAL OFFICER (Male or Female), graded Senior House Officer, at Banstead Wood, to become vacant 1st March, 1955. Candidates must have had experience in the treatment of sick children. The appointment will be for 1 year.

Application forms may be obtained from the Secretary at Hackney-road and should be returned with copies of not more than 3 testimonials not later than 17th January, 1955.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, London, E.15. HOUSE SURGEON (Male or Female; pre-registration; first or second post) for 6 months commencing 11th February, 1955.

Applications, with copies of testimonials, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, London, E.15, by 15th January, 1955.

ROYAL NATIONAL THROAT, NOSE AND EAR HOS-PITAL, Gray's Inn-road, W.C.1, and Golden-square, W.1. RESIDENT HOUSE SURGEON (post-registration post). Applications are invited for a 6-months appointment as from 1st February, 1955, with salary and conditions as laid down for House Officers in the terms and conditions of service in the National Health Service.

Applications, stating age, qualifications, full details of previous experience (particularly in this specialty), with copies of 1–3 recent testimonials, should be sent to the House Governor immediately.

ROYAL NORTHERN HOSPITAL, Holloway, London, N.7. Applications are invited for the post of SENIOR HOUSE OFFICER (orthopædics), vacant 16th February, 1955. Occasional casualty duties. Recognised for the F.R.C.S.

Applications to be sent to the Hospital Secretary by 11th January, 1955.

ROYAL FREE HOSPITAL. Applications are invited from registered medical practitioners for the appointment of REGISTRAR to the Department of Rheumatism. The appointment is full-time, non-resident, and for 1 year in the first instance. Duties to commence on 1st February, 1955. Salary and conditions of service in accordance with those laid down by the Ministry of Health.

Application forms may be obtained from the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 8th January, 1955.

ROYAL MASONIC HOSPITAL, Ravenscourt Park, W.6. RESIDENT SURGICAL REGISTRAR vacancy on 28th February, 1955. Gross salary £850 (residential emoluments of £130 deductible).

Please state age, qualifications, past and present appointments, and include 2 recent testimonials and the names of 2 referees. Applications should reach the Secretary and House Governor (from whom further information may be obtained) on or before 17th January, 1955.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Orthopædic Surgery to fill a vacancy in the approved trainee establishment at the Camberwell Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 15th January, 1955.

SOUTH LONDON HOSPITAL FOR WOMEN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of GYNÆCOLOGICAL HOUSE SURGEON, vacant 2nd February, 1955, for 6 months. Recognised for M.R.C.O.G.

Application forms from the Secretary

ST. BARTHOLOMEW'S HOSPITAL, E.C.1. Applications are invited for a post of SENIOR REGISTRAR in E.N.T. Surgery tenable for 4 years, subject to annual re-election.

Applications, with the names of 3 referees, should be submitted to the undersigned by 10th January, 1955.

C. C. CARUS-WILSON, Clerk to the Governors.

ST. JOHN'S HOSPITAL, St. John's Hill, S.W.11. Senior HOUSE OFFICER. Duties mainly in Geriatric Department, with some orthopædic work. Post offers excellent experience in these 2 fields. Particularly suitable for one working for higher qualifications.

Apply Medical Superintendent, with copies of 2 recent testimonials.

ST. MARY'S HOSPITAL CHILDREN'S DEPARTMENT, PRINCESS LOUISE KENSINGTON HOSPITAL FOR CHILDREN, St. Quintin-avenue, W.10. CLINICAL ASSISTANT (medical), Senior House Officer grade, required for 1 session per week Thursdays P.M. Vacant 1st February, 1955.

Applications, with names of 3 referees, to the undersigned not later than 12th January, 1955. A. C. YOUNG, Secretary.

ST. STEPHEN'S HOSPITAL, Fulham-road, S.W.10. OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON (resident), vacancy late February. Post recognised for D.Obst.R.C.O.G.

Applications, naming 2 referees, to Medical Superintendent.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy for a HOUSE PHYSICIAN (Senior House Officer) to the Neurological and Neurosurgical Department on 1st April, 1955.

Further particulars and form of application, which must be returned not later than Monday, 31st January, 1955, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be vacancies for the following Senior House Officers :—

2 HOUSE PHYSICIANS on 15th April, 1955.
1 HOUSE SURGEON on 15th April, 1955.

Further particulars and form of application, which must be returned not later than 31st January, 1955, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THORPE COOMBE MATERNITY HOSPITAL, Walthamstow, E.17. (54 Beds.) Applications are invited from medical Women for the post of JUNIOR OBSTETRIC OFFICER (graded House Officer), vacant 28th February, 1955. The Hospital is recognised by the Royal College of Obstetricians and Gynæcologists.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to the Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

WHIPPS CROSS HOSPITAL, Leytonstone, E.11. (924 Beds and within easy reach of Central London.) Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade) at the Area Laboratory situated in the above Hospital. The post offers very considerable experience and is suitable for persons wishing to train in pathology. The post is resident but adequate off duty is assured.

Application forms obtainable from the Secretary, Whipps Cross Hospital, should be completed and returned by 10th January, 1955.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10. CLINICAL ASSISTANT required, 1 session per week for Physical Medicine Clinic. General Practitioner grade. Annual appointment. (Present holder is applying.)

Applications, with names of 2 referees, to Group Secretary by 12th January, 1955.

WESTMINSTER CHILDREN'S HOSPITAL. WESTMINSTER HOSPITAL TEACHING GROUP. HOUSE SURGEON (post-registration or second pre-registration) required for 6 months from 1st March, 1955.

Applications, with copies of recent testimonials, should be sent to the Secretary, Westminster Children's Hospital, Vincent-square, S.W.1, by 15th January, 1955.

WESTMINSTER CHILDREN'S HOSPITAL. WESTMINSTER HOSPITAL TEACHING GROUP. HOUSE PHYSICIAN (second pre-registration) for 6 months from 1st February, 1955.

Apply immediately to Secretary, Westminster Children's Hospital, Vincent-square, S.W.1.

WOOLWICH GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics). 2 posts vacant 21st February at Memorial Hospital, Woolwich, and at St. Nicholas Hospital, Plumstead. Recognised for F.F.A.R.C.S. and D.A. 6 months appointments and may then be renewed. Salary £745 p.a., less £150 p.a. for residence.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. ABERDEEN ROYAL INFIRMARY. Applications are invited for the appointment of a REGISTRAR in Ophthalmology for the above Hospital. The post is a whole-time one and is non-resident. Salary and conditions of service are in accordance with the terms issued by the Department of Health for Scotland.

Applications, giving details of qualifications and experience, with the names of 2 referees, should be lodged with the Secretary, Aberdeen General Hospitals, 62, Queen's-road, Aberdeen, within 14 days of the appearance of this advertisement.

AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDEVILLE HOSPITAL. RESIDENT HOUSE PHYSICIAN for the Neurological Unit (a part of the Department of Neurology of the United Oxford Hospital), vacant 1st February, 1955. Recognised pre-registration post, also open to registered practitioners in which case status up to Senior House Officer may be awarded.

Applications, with copies of 2 testimonials, to the Administrative Officer.

BARNSTAPLE. NORTH DEVON INFIRMARY. (110 Beds.) HOUSE SURGEON (pre-registration) required. Post vacant 1st February, 1955.

Applications to Group Secretary, 19, Alexandra-road, Barnstaple.

BARRY ACCIDENT AND SURGICAL HOSPITAL. CARDIFF HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required immediately at above Hospital. Staffed by whole-time Consultant Surgeon and Senior Casualty Officer. Excellent experience given in general surgery.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

BASINGSTOKE. PARK PREWETT HOSPITAL. South WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR PSYCHIATRIC REGISTRAR at Park Prewett Hospital (1485 Beds). Candidates should possess the D.P.M. and have had considerable experience in psychiatry. Residential accommodation is available to a single man.

Application forms can be obtained from the Group Secretary, Park Prewett Hospital, and should be returned not later than 14 days after the appearance of this advertisement. Applicants may visit the Hospital by appointment.

BATH HOSPITAL MANAGEMENT COMMITTEE. Applications invited from registered medical practitioners for post of RESIDENT PATHOLOGIST (St. Martin's Hospital). The post affords experience in general clinical pathology and post-mortem work at St. Martin's Hospital and Area Central Laboratory, Bath, with duties connected with Area Blood Bank, Bath, and the Regional Blood Transfusion Service, Bristol. The post is graded Senior House Officer. Commencing date 14th March, 1955.

Applications, stating age, qualifications, and experience, with names of 3 referees, should be forwarded to Group Secretary, Manor Hospital, Combe Park, Bath, by 15th January, 1955.

BATH. ROYAL UNITED HOSPITAL. Applications are invited from medical practitioners for post of HOUSE PHYSICIAN (pædiatrics) at the above Hospital, vacant end of February. Post recognised for D.C.H. qualification and for pre-registration purposes.

Applications, stating age, qualifications and experience, with 3 testimonials, to be forwarded to Group Secretary, Bath Hospital Management Committee, Manor Hospital, Combe Park, Bath, by 15th January, 1955.

BATH. ST. MARTIN'S HOSPITAL. Applications are invited from medical practitioners for the post of HOUSE SURGEON (orthopædic) at above Hospital. Post offers opportunity not only in traumatic surgery but in "cold" orthopædics and the surgery of arthritis. Post recognised under F.R.C.S. regulations and for pre-registration purposes. Vacant end of January.

Applications, stating age, qualifications and experience, with 2 testimonials should be forwarded to Group Secretary, Bath Hospital Management Committee, Manor Hospital, Combe Park, Bath, by 15th January, 1955.

BEXHILL HOSPITAL, Bexhill. (62 Beds.) 2 House SURGEONS. Posts now vacant. A small modern hospital on the South Coast, considerable acute surgical work and busy Outpatient Department, excellent all-round experience. National scale of salary.

Apply to Hospital Administrator.

BIRMINGHAM. LORDSWOOD MATERNITY HOSPITAL, Lordswood-road, BIRMINGHAM, 17. RESIDENT OBSTETRIC HOUSE OFFICER. Commencing mid-February. 33 beds dealing with normal and abnormal midwifery. Recognised for D.Obst.R.C.O.G. and as a pre-registration post. Second period training school for pupil Midwives.

Applications to Obstetrician not later than 8th January, 1955.

BIRMINGHAM, 9. LITTLE BROMWICH HOSPITAL. SENIOR HOUSE OFFICER in Infectious Diseases. The Hospital serves a wide area and gives excellent opportunities for study of infectious diseases. Part of the Hospital is being developed as a general hospital, where further experience can be gained.

JUNIOR HOSPITAL MEDICAL OFFICER for Infectious Diseases. Post vacant 1st February, 1955. Previous experience in infectious diseases desirable.

Applications to Physician-Superintendent.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

1. **Birmingham (Selly Oak) Hospital Management Committee, Oak Tree-lane, Birmingham, 29**

REGISTRAR in General Surgery. Duties at Little Bromwich and Solihull Hospitals. High qualification desirable. Resident at Little Bromwich Hospital.

2. **South Worcestershire Hospital Management Committee, Worcester Royal Infirmary**

Locum REGISTRAR (general surgery) for Worcester Royal Infirmary (206 Beds), 3 months from mid-February. Recognised for F.R.C.S. Resident/non-resident. Flat nearby.

3. **West Bromwich and District Hospitals Group (No. 18), West Bromwich and District General Hospital, Edward-street, West Bromwich**

Whole-time REGISTRAR in Anæsthetics. Duties at Midland Centre for Neurosurgery, Smethwick Hospital and other Group Hospitals. Experience specialty required.

4. **South Warwickshire Hospital Group (No. 14), 50, Holly-walk, Leamington Spa**

Whole-time REGISTRAR in Orthopædics. Duties mainly at Warwick Hospital (350 Beds including 52 orthopædic). Recognised for F.R.C.S. Experience specialty essential and higher qualification an advantage.

Application forms from Group Secretaries, to be returned before 17th January, 1955. Candidates may visit hospitals.

BIRMINGHAM (SANATORIA) GROUP HOSPITAL MANAGEMENT COMMITTEE. YARDLEY GREEN HOSPITAL—THORACIC SURGICAL UNIT. Applications are invited for the post of SENIOR HOUSE OFFICER or HOUSE OFFICER according to experience. The appointment will give broad opportunities for experience in both tuberculous and non-tuberculous thoracic surgery.

Applications, stating age, qualifications, training and experience, together with copies of 3 recent testimonials, should be addressed to the Secretary, Yardley Green Hospital, Birmingham, 9.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. The following resident appointments are available for the 6-months period commencing 7th January, 1955. Recognised for pre-registration students but registered medical practitioners may apply.

The Queen Elizabeth Hospital

HOUSE SURGEON to the Neurosurgical Department.
HOUSE SURGEON to the E.N.T. Department.

The General Hospital

HOUSE SURGEON to the Gynæcological Department.
HOUSE SURGEON to the E.N.T. Department.

Forms of application may be obtained from the undersigned.

G. A. PHALP,
Secretary and Principal Administrative Officer,
The United Birmingham Hospitals.

Queen Elizabeth Hospital, Birmingham, 15.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE CHILDREN'S HOSPITAL. Applications are invited for the post of RESIDENT SURGICAL OFFICER (Registrar), vacant on 1st February, 1955, for 1 year. Candidates should have held house appointments and had surgical experience. Preference will be given to applicants who hold a higher qualification. Deduction of £150 from salary for residential emoluments.

Forms of application may be obtained from the House Governor, The Children's Hospital, Ladywood-road, Birmingham, 16, and should be returned not later than 24th January, 1955. G. A. PHALP, Secretary to the Board of Governors.

BISHOP AUCKLAND GENERAL HOSPITAL. (350 Beds.) SOUTH WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN required, fully registered practitioner.

Apply, naming 2 referees, to—

K. G. T. LUXFORD, Group Secretary/Finance Officer.
The General Hospital, Bishop Auckland, County Durham.

BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.

JUNIOR HOSPITAL MEDICAL OFFICER. For duties in the Geriatric Department (which contains acute admission wards and has full physiotherapy, laboratory, and radiological facilities) and also to assist in the supervision of the health of nurses. Appointment will be for a period of 4 years in the first instance.

RESIDENT ANÆSTHETIST (Senior House Officer grade). Main duties at Bolton District General Hospital and Bolton Royal Infirmary. Tenable for 12 months and recognised for the D.A. and F.F.A.R.C.S.

Applications, stating age, nationality, qualifications, experience, and the names of 2 referees, to Group Secretary, The Royal Infirmary, Bolton.

BRADFORD. ROYAL EYE AND EAR HOSPITAL. HOUSE SURGEON (ophthalmology), vacant now. Recognised for D.O.M.S. and F.R.C.S. Salary according to Whitley Council (M.D.B.) rates.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BURTON-ON-TRENT GENERAL INFIRMARY. RESIDENT ANÆSTHETIST (Junior Hospital Medical Officer). Non-resident considered. Recognised for the F.F.A.R.C.S.

Applications to Group Secretary.

BRENTWOOD, ESSEX. WARLEY HOSPITAL. Locum PSYCHIATRIC REGISTRAR or SENIOR REGISTRAR (Male or Female) required for a period of up to 6 months from 20th January, 1955. Married or single. Single accommodation available at £150 p.a. Salary £17 10s. or £24 per week according to experience.

Apply to Physician-Superintendent.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. House OFFICER (E.N.T. Department) for 6 months from 25th January. Recognised Pre-registration Service (surgical).

Apply, stating age, nationality, qualifications, and experience with dates, and copies of 3 testimonials, to the Secretary as soon as possible.

CAMBRIDGE. FULBOURN HOSPITAL. Senior House OFFICER (resident or non-resident). Previous psychiatric experience not required. This Hospital of 971 Beds is linked with the Cambridge University Department of Psychology and Addenbrooke's Hospital, and provides a basic psychiatric training leading to the D.P.M.

Applications, stating age, qualifications, and experience, with names of 2 referees, should be sent to—

Dr. D. H. CLARK, Medical Superintendent.
Fulbourn Hospital, near Cambridge.

CARDIFF. THE UNITED CARDIFF HOSPITALS. The Board of Governors invites applications for the appointment of SENIOR HOUSE OFFICER to the Ophthalmic Department at the Cardiff Royal Infirmary.

Application forms can be obtained from the Secretary, United Cardiff Hospitals, Cardiff Royal Infirmary, Newport-road, Cardiff.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER in the Orthopædic Department at the Cardiff Royal Infirmary.

Application forms obtainable from the Secretary, United Cardiff Hospitals, Cardiff Royal Infirmary.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the post of REGISTRAR in the Orthopædic Department at the Cardiff Royal Infirmary.

Application forms obtainable from the Secretary, United Cardiff Hospitals, Cardiff Royal Infirmary.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. SENIOR HOUSE OFFICER (Chest Unit), medical and surgical duties, vacant early February.

Applications, stating age, qualifications and experience, with copies of testimonials and the names and addresses of 2 referees, should be sent to the Group Secretary at above address.

CHELMSFORD AND ESSEX HOSPITAL, London-road, CHELMSFORD. (162 Beds.) Applications are invited for the post of HOUSE PHYSICIAN (pre-registration post), to work in the general medical wards of the above Hospital. Duties will commence 25th January.

Applications, with copies of 2 recent testimonials, should be sent to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHEPSTOW. CHEST UNIT, MOUNT PLEASANT HOSPITAL. (150 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER and SENIOR HOUSE OFFICER (resident, or non-resident locally) required. Some previous experience in tuberculosis desirable for Junior Hospital Medical Officer, but not Senior House Officer who will receive a thorough training in the specialty. A new Thoracic Unit is now opening; medical and surgical duties are included in both appointments. Senior Hospital Medical Officer also resident.

Write, quoting 2 referees, to—

T. A. JONES, Group Secretary.
64, Cardiff-road, Newport, Mon.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botleys Park War Hospital). (430 Beds.) ORTHOPÆDIC HOUSE SURGEON required immediately. Senior House Officer or House Officer (Intern grade). Post recognised for F.R.C.S. for pre-registration internship. Preference will be given to provisionally registered candidates. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, as soon as possible.

OLIVER PLUNKETT, Physician-Superintendent.

CHESTERFIELD ROYAL HOSPITAL. (324 Beds.)

HOUSE PHYSICIAN required mid-January. Recognised for pre-registration purposes.

2 HOUSE SURGEONS required mid-January. Posts recognised for Pre-registration Service and F.R.C.S. training.

CASUALTY OFFICER required mid-January. Recognised for pre-registration purposes.

For interview please apply M. H. BOONE, Secretary, Chesterfield Hospital Management Committee.

COLCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following posts:—

Essex County Hospital, Colchester (188 Beds)

HOUSE OFFICER (surgical), first, second, third or pre-registration post; tenable for 6 months.

Black Notley Hospital, Braintree, and Essex County Hospital, Colchester

HOUSE SURGEON, first, second, third or pre-registration post; tenable for 6 months. Duties to include work in general surgical and gynæcological wards. Recognised for F.R.C.S.

Essex County Hospital, Colchester (19 gynæcological beds), **Colchester Maternity Hospital** (22 obstetric beds)

HOUSE OFFICER (Male or Female), Obstetric and Gynæcological, first, second, third or pre-registration post; tenable for 6 months.

Applications, with copies of 3 testimonials, to the Group Secretary, 14, Pope's-lane, Colchester, Essex.

DONCASTER ROYAL INFIRMARY. (330 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT MEDICAL REGISTRAR required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 10th January, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DOVERCOURT. HARWICH AND DISTRICT HOSPITAL. (30 Beds.) Applications invited for post of SENIOR HOUSE OFFICER (Resident Surgical Officer). Post tenable for 1 year.

Applications, with copies of 3 testimonials, to the Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP. BIRMINGHAM REGION. Applications invited from registered practitioners for following appointments :—

The Guest Hospital, Dudley (154 Beds)

SENIOR HOUSE OFFICER (Anæsthetist). Post now vacant.

HOUSE OFFICER (surgical), pre-registration. Post vacant January.

Wordsley Hospital, near Stourbridge (478 Beds)

SENIOR HOUSE OFFICER (resident), Anæsthetist. Post now vacant. In addition to general surgery, experience is available in gynæcology and there is a major Orthopædic Unit. [illegible]onal Plastic Surgery Unit at this Hospital.

SENIOR HOUSE OFFICER (surgical).

HOUSE OFFICER (surgical), pre-registration. Post vacant January.

The Corbett Hospital, Stourbridge (106 Beds)

HOUSE OFFICER (surgical) pre-registration. Post vacant 8th January.

Applications, stating age, experience, with copies of 3 recent testimonials, to Group Secretary, The Guest Hospital, Dudley, Worcs.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. ENFIELD GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT PATHOLOGIST (Senior House Officer grade) for duties in the Area Laboratory and at other hospitals in the Group. The Area Laboratory is recognised for the Diploma of Pathology of the Royal Colleges of Physicians and Surgeons. Further information can be obtained from the Senior Pathologist. Appointment tenable for 1 year.

Applications, with the names of 2 referees, to the Secretary of the Management Committee at Chase Farm Hospital by 7th January, 1955.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (Fracture Department), vacant 21st February, 1955.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 15th January, 1955.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from registered medical practitioners for the appointment of HOUSE SURGEON (Obstetric and Gynæcological Department), vacant 10th February, 1955. This is a recognised pre-registration appointment.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 8th January, 1955.

GLASGOW (near). CANNIESBURN HOSPITAL AND SCHAW HOME, BEARSDEN, near GLASGOW. 1 JUNIOR HOSPITAL MEDICAL OFFICER required for duties at both of these Hospitals. Canniesburn Hospital has 132 Beds ; 42 for private patients, 10 for maxillo-facial surgery, and 80 for pre-convalescent patients from Glasgow Royal Infirmary. Schaw Home has 70 Beds used for the aged and chronic sick. Residence at Canniesburn Hospital.

Apply, giving 3 names for reference, not later than 6th January, 1955, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GLASGOW ROYAL INFIRMARY. Senior House Officer in Medicine (cardiology), based at above Infirmary.

Write, giving 3 names for reference, not later than 6th January, 1955, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GLASGOW, N.1. STOBHILL GENERAL HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in the Acute Geriatric Unit (70 Beds/for assessment and rehabilitation) supervised by a Consultant Physician specialising in geriatrics. The appointment offers excellent clinical experience in the diagnosis and treatment of acute and other illnesses in the elderly, and will be for 2 years in the first instance.

Applications, stating age, qualifications and experience, with the names of 2 referees, to be sent to the Medical Superintendent.

GRANTHAM AND KESTEVEN GENERAL HOSPITAL. (117 Beds.) RESIDENT HOUSE PHYSICIAN (Senior House Officer or pre-registration intern). General medical and pædiatric. Post vacant 7th February, 1955.

Applications, with full details, and names of 2 referees, to Secretary, 101, Manthorpe-road, Grantham.

GRIMSBY GENERAL HOSPITAL. (238 Beds.) Grimsby HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR (pre-registration) or SENIOR HOUSE OFFICER (surgical), vacant from 26th January, 1955.

Applications, with names of 2 referees, to Hospital Secretary, Grimsby General Hospital.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) HOUSE SURGEON required. Pre-registration post, vacant 10th February, 1955. National scale of salary.

Apply to Hospital Administrator.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) SENIOR HOUSE OFFICER (casualty and orthopædic), post vacant 26th January, 1955. National scale of salary.

Apply to Hospital Administrator.

HAILSHAM, SUSSEX. HELLINGLY MENTAL HOS-PITAL. HAILSHAM HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER. Single residential accommodation available. Salary £775 p.a., rising by annual increments of £50 to £1075 p.a.

Applications, stating age, qualifications, and appointments held, to the Medical Superintendent, Hellingly Hospital, Hailsham, Sussex.

HALIFAX. ROYAL HALIFAX INFIRMARY. Senior HOUSE OFFICER required for duty in the Orthopædic and Casualty Departments under the supervision of the Senior Hospital Medical Officer. Post recognised for F.R.C.S. and vacant now. Salary £745 p.a., with deduction of £130 p.a. for board, lodging, &c.

Applications to Group Secretary, Royal Halifax Infirmary, Halifax.

HAREFIELD HOSPITAL, Harefield, Middlesex. North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. MEDICAL REGISTRAR required at above Hospital. Previous experience in general medicine and in the treatment of tuberculosis essential. The Hospital has approximately 450 Beds for the treatment of tuberculosis in all its forms, a non-tuberculosis Thoracic Surgical Unit of 100 Beds and 100 general medical and surgical beds. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, the Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middlesex, by 11th January, 1955.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds. Recognised for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE OFFICER (medical). Salary £425, £475, or £525 p.a., according to experience (plus special grant of £50 p.a.), less £125 p.a. for residential emoluments.

Applications, stating age, qualifications, experience and nationality, with names and addresses of 3 referees, to Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds. Recognised by the Royal College of Surgeons and for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE OFFICER (surgical). Salary £425, £475, or £525 p.a., according to experience (plus special grant of £50 p.a.), less £125 p.a. for residential emoluments.

Applications, stating age, qualifications, experience and nationality, with names and addresses of 3 referees, to Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HILLINGDON HOSPITAL, near Uxbridge, Middlesex. (General—705 Beds.) REGISTRAR in Otorhinolaryngology Department. Ample opportunity for practical operative experience. Hospital may be visited by direct appointment. Post vacant 1st February, 1955.

Application forms obtainable from, and returnable to, Group Secretary, Uxbridge Group Hospital Management Committee, The Furze, Pield Heath-road, Uxbridge, Middlesex, by 10th January.

HILLINGDON HOSPITAL, near Uxbridge, Middlesex. HOUSE SURGEON (resident) required for obstetric duties at above Hospital. Previous obstetric experience desirable but not essential. Recognised for D.Obst.R.C.O.G. and M.R.C.O.G. Vacant middle February.

Apply, stating age, nationality, qualifications, experience, and enclosing copies of not more than 3 recent testimonials, to Medical Director by 10th January.

HORNCHURCH ESSEX. ST. GEORGE'S HOSPITAL. JUNIOR HOSPITAL MEDICAL OFFICER (resident) required early in January, 1955, at this Hospital which accommodates 339 chronic sick patients. The post offers excellent geriatric experience.

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, as soon as possible.

HOUNSLOW HOSPITAL, Staines-road, Hounslow, MIDDLESEX. (General acute—81 Beds.) Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN. Recognised pre-registration appointment for 6 months. Vacant 10th February, 1955. Preference will be given to persons seeking post for pre-registration under Medical Act, 1950.

Applications, stating qualifications and age, with copies of up to 3 recent testimonials, or names for reference, to the Hospital Secretary.

HOVE, SUSSEX. THE LADY CHICHESTER HOSPITAL, New Church-road. (70 Beds.) Applications invited for post of JUNIOR HOSPITAL MEDICAL OFFICER at above Hospital, a Neurosis Centre for men, women and children with Outpatients Department. The post is resident and accommodation is only available for a single person. Salary £775 p.a. rising by annual increments to £1075 p.a., less a charge of £150 p.a. for board-residence. Conditions of service in accordance with national recommendations.

Applications, stating nationality, age, sex, qualifications and experience, together with the names of 3 referees, to the Secretary, Hospital Management Committee, St. Francis Hospital, Haywards Heath, Sussex.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. CASUALTY OFFICER (Junior Hospital Medical Officer). Post vacant 1st February, 1955.

Applications, mentioning 2 names for reference, should be sent to the Hospital Secretary

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. HOUSE SURGEON (pre-registration).

Applications, mentioning 2 names for reference, should be sent to the Hospital Secretary at once.

HERTFORD COUNTY HOSPITAL. (Situated 21 miles from London.) Applications are invited from registered medical practitioners for the appointment of a Whole-time Temporary REGISTRAR (surgical) to commence on or about 1st January, 1955. Salary at the rate of £850/£965 p.a., according to service in the grade.

Applications, giving full details, together with copies of recent testimonials or the names of referees, to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty on 1st February, 1955. The post is recognised as a pre-registration appointment. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HULL. VICTORIA HOSPITAL FOR SICK CHILDREN, Park-street. HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required immediately. Pre-registration or post-registration. 6-monthly term; counts towards the D.C.H. qualification. Salary according to national scale.

Send replies, with testimonials, to the Hospital Secretary.

IPSWICH. EAST SUFFOLK AND IPSWICH HOS-PITAL. (360 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

IPSWICH. EAST SUFFOLK AND IPSWICH HOSPITAL. (360 Beds.) Applications are invited for the post of HOUSE SURGEON to the E.N.T. and Ophthalmic Departments, vacant on 25th January, 1955. The post is recognised for pre-registration and for the D.L.O. examination.

Applications, giving full particulars and copies of recent testimonials, to the Hospital Secretary.

KIDDERMINSTER AND DISTRICT GENERAL HOS-PITAL. (112 Beds.) HOUSE SURGEON (pre-registration), required at the above Hospital. Post vacant 1st January, 1955.

Applications, with the names of 3 referees, to the Hospital Secretary.

KIDDERMINSTER AND DISTRICT GENERAL HOS-PITAL. (112 Beds.) HOUSE SURGEON required at the above Hospital. Post vacant 1st January, 1955. Salary £425–£525, according to experience.

Applications, with the names of 3 referees, to the Hospital Secretary.

KNARESBOROUGH. SCOTTON BANKS HOSPITAL, Ripley-road, KNARESBOROUGH. HARROGATE AND RIPON HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Tuberculosis Hospital of 303 Beds. Resident accommodation available for married or single person. The appointment will be for 3 years commencing on appropriate position on the salary scale £775–£50–£1075 with a deduction for board and lodging if resident.

Applications, giving details of age, qualifications and experience, together with the names and addresses of 3 referees, to be forwarded to the Medical Superintendent at the above Hospital.

LANCHESTER, CO. DURHAM. MAIDEN LAW HOS-PITAL. NORTH WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER at the above Hospital. Appointment for 6 months in the first instance with prospect of renewal. The Hospital has 72 Beds for the treatment of pulmonary tuberculosis by all modern methods. Salary at the rate of £745 p.a., less a charge of £150 p.a. for board and lodging.

Applications, stating age, qualifications, experience, with copies of recent testimonials, should be forwarded to the Group Secretary, Shotley Bridge General Hospital, Shotley Bridge, Consett, co. Durham.

LEICESTER ISOLATION HOSPITAL AND CHEST UNIT. (266 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time REGISTRAR (chest and infectious diseases) required. This Hospital has a complete Thoracic Surgical Unit including cardiac work; outpatient sessions for chest diseases and cardiology also held. Single accommodation is available. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 10th January, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LIVERPOOL AND DISTRICT EASTERN HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for HOUSE SURGEONS (obstetrics and gynæcology) tenable for a period of 6 months from 1st March, 1955, as under :—

Broadgreen Hospital, Liverpool, 14.—2.

Mill Road Maternity Hospital, Liverpool, 6.—2.

The posts are recognised for pre-registration purposes; preference will be given to registered medical practitioners. Salary £425–£475–£525 p.a. according to experience, less a deduction of £125 p.a. in respect of residential emoluments.

Application forms obtainable from the undersigned to be returned completed within 10 days of this advertisement.

H. BLYTHE, Group Secretary.

Broadgreen Hospital, Liverpool, 14.

LIVERPOOL, 20. BOOTLE HOSPITAL. House Surgeon required from 1st February, 1955. Recognised pre-registration post.

Apply to Secretary, Walton Hospital, Liverpool, 9.

LIVERPOOL, 14. BROADGREEN HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN as from 1st March, 1955, for a period of 6 months. The post is in a General Medical Unit and is recognised for pre-registration purposes. Salary £425–£475–£525 according to experience, less £125 in respect of residential emoluments.

Applications on forms obtainable from the undersigned at the above address, to be returned within 10 days of this advertisement.

H. BLYTHE, Group Secretary.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the appointment of SENIOR REGISTRAR in Psychiatry for duties at the General Infirmary at Leeds as Trainee Specialist in Child Psychiatry and at the Westwood Hospital, Bradford, and other associated mental deficiency colonies. The duties will be allocated as to 5 sessions at the University Department of Psychiatry at the General Infirmary at Leeds and the remainder of the time in mental deficiency clinical duties. Accommodation is available for a single person. The appointment may be non-resident in which case the person appointed should reside in Bradford. Candidates must hold the D.P.M. or equivalent qualification.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names and addresses of 3 referees, should be forwarded to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, not later than 20th January, 1955.

LEEDS REGIONAL HOSPITAL BOARD. Short-term LOCUM TENENS appointments in the Registrar grade are constantly available at hospitals in the area of the Board, particularly in the specialties of anæsthetics, general medicine, general and orthopædic surgery, and psychiatry.

Interested practitioners, suitably experienced, should communicate with the Secretary, Joint Registrars Committee, Park-parade, Harrogate.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the following REGISTRAR posts :—

Anæsthetics

Duties in the Hull A, B and East Riding Groups. Recognised for the F.F.A.R.C.S. Duties may include thoracic anæsthesia (non-resident).

General Medicine

Duties at the Regional Rheumatism Centre, Harrogate (240 Beds) (9 sessions), and the Rheumatism Clinic, General Infirmary at Leeds (2 sessions). Resident at Royal Bath Hospital, Harrogate.

Obstetrics and Gynæcology

Duties at hospitals in Wakefield A and B Groups (with occasional duties in Pontefract and Goole Groups) (non-resident). Offers good experience but is not at present recognised by the R.C.O.G. for membership purposes. Aggregate of 120 obstetric and 50 gynæcological beds.

Orthopædic Surgery

(*a*) Woodlands Orthopædic Hospital, Rawdon (100 Beds), and Orthopædic Outpatient Department, Bradford Royal Infirmary. Offers excellent training in all branches of accident and orthopædic surgery. May be non-resident.

(*b*) Hull A Group (50 orthopædic beds), Hull B Group and East Riding Group (50 orthopædic beds) (non-resident). Includes some duties in the Casualty Department at the Hull Royal Infirmary.

(*c*) Huddersfield Royal Infirmary and other hospitals in the Huddersfield Group (34 orthopædic beds) (non-resident).

Psychiatry

Oulton Hall Hospital, near Wakefield, and affiliated Mental Deficiency Colonies (aggregating 780 Beds) (non-resident). Facilities for attendance at the Leeds University will be provided if the successful candidate is studying for the D.P.M.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, should be forwarded to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, not later than 13th January, 1955.

LEEDS, 9. ST. JAMES'S HOSPITAL. Leeds A Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners (Male and Female) for the appointment of SENIOR HOUSE OFFICER (orthopædics). The appointment will be for a period of 1 year and the salary will be in accordance with the agreed terms and conditions of service of hospital medical and dental staffs—namely, £745 p.a., with an appropriate deduction in respect of board, lodgings, and other services provided.

Applications, stating age, qualifications, experience, &c., together with the names of 2 referees, to be forwarded to the undersigned as soon as possible.

J. FOLKARD, Secretary to the Committee.

Administrative Offices, St. James's Hospital, Leeds, 9.

LEEDS. UNITED LEEDS HOSPITALS. The General INFIRMARY AT LEEDS. RESIDENT MEDICAL OFFICER required at the Ida and Robert Arthington Hospital, Cookridge, Leeds. The Hospital is used as a pre-convalescent annexe to the Teaching Hospital. The post is of Senior House Officer status and the salary is £745 p.a.

Applications, giving age, qualifications, posts held with dates, and 3 names for reference, should be sent to the Secretary to the Board as soon as possible.

LEEDS. UNITED LEEDS HOSPITALS. The General INFIRMARY AT LEEDS. RESIDENT ANÆSTHETIC OFFICER required. The post is of Senior House Officer status and the salary at the rate of £745 p.a.

Applications, giving age, qualifications, posts held with dates, and 3 names for reference, should be sent to the Secretary to the Board as soon as possible.

MANCHESTER. UNITED MANCHESTER HOSPITALS MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for SENIOR HOUSE OFFICER post. Salary £745 p.a., less £155 p.a. for residential emoluments.

Application forms may be obtained from the undersigned.

H. R. NORTH, General Superintendent.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. REGISTRAR to the E.N.T. Department, to commence as soon as possible.

Applications to be made on forms obtainable from the undersigned and to be returned not later than 15th January, 1955.

G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR HOUSE OFFICER (surgical) to commence on 1st March, 1955. Whole-time, non-resident training post, tenable for 6 months, renewable for a second 6 months. Duties allotted in Orthopædic, Surgical, Outpatients, and General Surgical Units in rotation.

Application form obtainable from the undersigned, to be returned by 15th January, 1955. G. H. TAYLOR, Secretary.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics) required. Post recognised by the Royal College of Surgeons for the F.F.A.R.C.S. and for the D.A. The successful candidate will have the opportunity of experience at the various units within the Group.

Applications, with full details, to the Group Secretary immediately.

MANCHESTER REGIONAL HOSPITAL BOARD. RegisTRAR in Venereology in the Bolton (main centre), Bury and Wigan areas. Post vacant 1st April, 1955.

Applications, stating age, nationality, qualifications, experience, and the names of 2 referees, should be sent immediately to Group Secretary, Bolton and District Hospital Management Committee, The Royal Infirmary, Bolton.

MANCHESTER REGIONAL HOSPITAL BOARD. The ROYAL INFIRMARY, BOLTON. (237 Beds.) RESIDENT REGISTRAR in General Surgery (Resident Surgical Officer). Recognised for F.R.C.S. The post is the senior resident surgical appointment and offers excellent practical experience.

Applications, stating age, nationality, qualifications, experience and the names of 2 referees, should be sent immediately to Group Secretary, Bolton and District Hospital Management Committee, The Royal Infirmary, Bolton.

MANCHESTER REGIONAL HOSPITAL BOARD. 3 posts of NON-RESIDENT SENIOR REGISTRAR in Radiology :—

(*a*) South Manchester Group (Withington Hospital).
(*b*) North Manchester Group (Ancoats, Manchester Northern, and Manchester Victoria Memorial Jewish Hospitals).
(*c*) Salford Group (Salford Royal Hospital, &c.).

Arrangements may later be made for the persons appointed to transfer to the United Manchester Hospitals to continue training.

Application forms from the Senior Administrative Medical Officer, Cheetwood-road, Manchester, 8, to be returned by 14th January, 1955.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. The Board invite applications from registered practitioners for the post of REGISTRAR (geriatrics) at Withington Hospital. The post offers excellent experience in all branches of geriatric medicine in a well-established department.

Applications, stating age, qualifications, present post, experience and names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RECEIVING ROOM OFFICER. Post vacant January, 1955. Salary £745 a year with a deduction of £150 a year for residential emoluments.

Applications to the Administrative Officer at the Hospital as soon as possible.

MID-GLAMORGAN HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following medical staff vacancies :—

Neath General Hospital, Neath (412 Beds)
HOUSE SURGEON, vacant 1st February, 1955.
HOUSE PHYSICIAN, vacant 1st February, 1955.
HOUSE SURGEON (obstetrics and gynæcology), vacant 8th March, 1955.

Bridgend General Hospital, Quarella-road, Bridgend (364 Beds)
HOUSE SURGEON (obstetrics and gynæcology), vacant 1st February, 1955.

Applications, naming 2 referees, to be addressed to the Group Secretary of the Committee, 8, Wind-street, Neath.

NEWCASTLE REGIONAL HOSPITAL BOARD. TeesSIDE HOSPITAL MANAGEMENT COMMITTEE. Locum SENIOR REGISTRAR GENERAL SURGEON (whole-time), for a period of 6 months.

Applications, together with names and addresses of referees (preferably), or testimonials, to a total of 3, to be sent to the Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, immediately.

NOTTINGHAM AND MIDLAND EYE INFIRMARY. Required, SENIOR HOUSE OFFICER, duties to commence as soon as possible. Salary and conditions of service in accordance with Ministry regulations.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners (Male or Female—locum tenens considered) for the post of RESIDENT SENIOR ANÆSTHETIC HOUSE OFFICER. Duties to commence as soon as possible. Terms and conditions of service in accordance with published regulations of the Ministry of Health, £150 deducted for residential emoluments.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—

HENRY M. STANLEY, Group Secretary.

NOTTINGHAM. HIGHBURY HOSPITAL. Applications are invited from fully qualified medical practitioners for the post of SENIOR HOUSE OFFICER in the Obstetrical and Gynæcological Department (41 obstetrical beds, 11 gynæcological beds and a small block for puerperal pyrexia). The appointment is for a period of 12 months commencing about the middle of January. The Hospital is recognised for the M.R.C.O.G. (Obstetrics only). Previous obstetric experience required. Salary and conditions of service in accordance with the Ministry regulations.

Applications, stating age, qualifications, and experience, also nationality, with copies of 3 recent testimonials, to be sent to—

General Hospital, Nottingham. HENRY M. STANLEY.

NEWMARKET GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (Obstetrics (14 Beds) and Gynæcology (10 Beds)), with opportunity for gaining experience in general surgery, required on 22nd January, 1955. Salary £745, less emoluments.

Applications, giving age, nationality, and qualifications, together with copies of 3 recent testimonials, to be addressed to the Physician-Superintendent.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.

SENIOR REGISTRAR in Mental Deficiency (house or single quarters available), Royal Eastern Counties Hospital, Colchester, Essex (1700 Beds). Candidate must hold D.P.M. or equivalent. Full opportunities for experience and instruction in all aspects of mental deficiency. A proportion of duties will be in the Hospital's fully equipped Research Department (Director : Dr. J. A. Fraser Roberts). Further particulars on application. 4 year appointment subject to annual review.

Applications in triplicate with names of 2 referees, to Secretary, North East Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 15th January, 1955.

NORTH SHIELDS, NORTHUMBERLAND. PRESTON HOSPITAL. Pre-registration appointment of HOUSE SURGEON available for 6 months from January, 1955.

Applications to Group Secretary as soon as possible.

NORWICH. NORFOLK AND NORWICH HOSPITAL. Applications are invited for the following appointments vacant on 1st February, 1955. All are pre-registration posts and the salaries in each case are at the rate of £425, £475, or £525 p.a. according to experience, less £125 p.a. for residential emoluments :—

(1) Norfolk and Norwich Hospital, Norwich

HOUSE SURGEON (Male or Female). Post recognised for Final F.R.C.S. examination. Duties entirely general surgical.

(2) West Norwich and Norwich Isolation Hospitals

HOUSE PHYSICIAN (Male or Female). Duties include acute medical, geriatric and infectious diseases. The beds at these units are under the control of the Consultant Physicians of the Norfolk and Norwich Hospital and the successful candidate will be required to undertake general medical duties under their supervision.

(3) West Norwich Hospital

HOUSE SURGEON (Male or Female). Post recognised for Final F.R.C.S. examination. The beds at this Hospital are under the control of the Consultant staff of the Norfolk and Norwich Hospital.

(4) Norfolk and Norwich Hospital, Norwich

Applications are also invited for the following Senior House Officer appointment vacant 1st February, 1955 :—

SENIOR CASUALTY OFFICER AND HOUSE SURGEON (Male or Female) to the Septic Block (2 Casualty Officers employed). Recognised for Final F.R.C.S. examination requirements. Salary £745 p.a., less £150 for full residential emoluments.

Applications for all the above posts, stating age, qualifications and experience, with names of 2 referees, to be sent to Group Secretary, No. 6 Group Hospital Management Committee, St. Stephen's-road, Norwich.

OXFORD REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR REGISTRAR (whole-time) in General Medicine to the Northampton Group of hospitals. Single accommodation available. The appointment will be for 1 year and is eligible for extension. Applicants should hold a higher medical qualification.

Application forms from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, to reach him by 8th January, 1955.

OXFORD. UNITED OXFORD HOSPITALS. Applications invited for post of NON-RESIDENT REGISTRAR in Pathology at the Radcliffe Infirmary.

Applications, on form obtainable from the Administrator, Radcliffe Infirmary, Oxford, to be received not later than 14th January, 1955.

OXFORD. UNITED OXFORD HOSPITALS. Applications invited for post of RESIDENT REGISTRAR in General Surgery at the Churchill Hospital with effect from 1st February, 1955. Appointment for 1 year in first instance, eligible for extension for a further year.

Applications, on forms obtainable from Administrator, Radcliffe Infirmary, Oxford, to be received not later than 14th January, 1955.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE. (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 177,000. Recognised for M.R.C.O.G., D.Obst.R.C.O.G., D.C.H., F.F.A.R.C.S., F.R.C.S.) PONTYPRIDD AND RHONDDA HOSPITAL MANAGEMENT COMMITTEE.

HOUSE OFFICER (surgical).
HOUSE OFFICERS (medical).
HOUSE OFFICER (pædiatrics).
HOUSE OFFICERS (obstetrics).

To commence 1st February, 1955. Persons appointed will perform duties at other hospitals in the Group as required.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Courthouse-street, Pontypridd.

PAISLEY. RICCARTSBAR MENTAL HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital, which is recognised for training for the London University, London Conjoint, and R.M.P.A. Diplomas in Psychological Medicine. The Hospital, of approximately 350 Beds, uses all modern treatments, and has associated Adult and Child Guidance Clinics. The successful candidate will be given every facility to attend special courses of instruction and clinics. Salary and conditions of service in accordance with National Health Service regulations.

Applications, in writing, with the names of 2 referees, should be sent to the Physician-Superintendent within 14 days of this date.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. DEPARTMENT OF OBSTETRICS AND GYNÆCOLOGY. PLYMOUTH, SOUTH DEVON AND EAST CORNWALL GENERAL HOSPITAL GROUP. Applications invited from duly qualified and registered medical practitioners for the appointment of SENIOR HOUSE OFFICER in Obstetrics and Gynæcology, vacant 1st April, 1955. There will be additional duties at the Plete Maternity Home, and the Alexandra Maternity Home, which are parts of the Department. Candidates should have had previous experience in a Department of Obstetrics and Gynæcology. The appointment will be for a period of 12 months. Salary £745 p.a. Terms and conditions of service are in accordance with the National Health Service terms. The post is recognised by the Royal College of Obstetricians and Gynæcologists for the Membership examination of the College.

Applications, stating age, nationality, qualifications and experience, together with the names and addresses of 3 referees, should be sent to ARTHUR R. CASH, Group Secretary.

7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

SENIOR HOUSE OFFICER in Casualty, vacant 5th February, 1955.

SENIOR HOUSE OFFICER in Surgery, vacant 4th February, 1955, at the Devonport Branch, a Surgical Unit (72 Beds). Recognised for the F.R.C.S.

HOUSE SURGEON, vacant January, 1955, pre-registration post, recognised for the F.R.C.S.

Applications, stating age, nationality, qualifications, and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth.
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Royal Portsmouth Hospital

(*a*) HOUSE OFFICER for 15 pædiatric and 15 acute medical beds. Vacant 16th January, 1955.

(*b*) HOUSE OFFICER required in the Traumatic and Orthopædic Department (105 Beds). Duties mainly at the Royal Portsmouth Hospital. Vacant now

Applications, stating age, experience, and qualifications, together with names of 2 referees, should be forwarded as soon as possible to L. C. ROGERS.

35, Grove-road South, Southsea.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of a JUNIOR HOSPITAL MEDICAL OFFICER in the Area Department of Diseases of the Chest, for duty in the Reading Chest Clinic. Starting salary within the scale will be fixed by agreement with Ministry of Health, according to qualifications and experience.

Applications, stating age and qualifications, together with names of 3 referees, should be sent to the Group Secretary at 3, Craven-road, Reading.

READING. ROYAL BERKSHIRE HOSPITAL. (403 Beds.) Applications are invited from registered and provisionally registered medical practitioners (Male or Female) for the resident post of JUNIOR HOUSE SURGEON (E.N.T.), vacant 16th February, 1955. Salary £425–£525 p.a., less £125 board-residence.

Write, stating age, qualifications with dates, nationality, with copy of 1 recent testimonial, to Secretary.

REDHILL COUNTY HOSPITAL, Earlswood Common, REDHILL, SURREY. Locum Tenens REGISTRAR in Obstetrics and Gynæcology. Whole-time resident required from mid-January, 1955. 2-year appointment will probably be advertised shortly. Married quarters may be provided.

Apply Group Secretary, Earlswood Mount, Pendleton-road, Redhill (Redhill 3581).

RICHMOND, SURREY. CASSEL HOSPITAL for Functional NERVOUS DISORDERS. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER. Preference given to applicants having experience or interest in psychotherapy and must have special interest in psycho-analysis. Candidates may visit the Hospital by appointment.

Application forms may be obtained from the undersigned and should be returned to the Secretary within 14 days of the appearance of this advertisement.

D. MALLION, Secretary,
Cassel Hospital Management Committee.
Ham Common, Richmond.

RUGBY. HOSPITAL OF ST. CROSS. (152 Beds.) CASUALTY AND ACCIDENT OFFICER (Junior Hospital Medical Officer status). To include duties in the Orthopædic Department. Salary £775–£1075 p.a. Resident.

Applications to Group Secretary, No. 20 Group Hospital Management Committee, Stoney Stanton-road, Coventry.

RUGBY. HOSPITAL OF ST. CROSS AND ST. MARY'S HOSPITAL. HOUSE OFFICER in Midwifery and Gynæcology required 19th January. Not pre-registration. Obstetric 40 Beds, Gynæcology 12 Beds.

Applications to the Secretary, Group 20 Hospital Management Committee, Stoney Stanton-road, Coventry.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER (resident) required from 1st January, 1955, for duties in the Casualty and Admissions Department. This is a large general hospital with specialised departments dealing with all types of acute medical and surgical cases. The post affords good opportunity for gaining tuition and experience.

Applications should be addressed to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, as soon as possible.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) HOUSE PHYSICIAN (resident) required from 25th January, 1955. Open to either pre-registration applicants or to fully qualified practitioners. Post tenable for 6 months.

Apply to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, as soon as possible.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER in Pathology required in this large general hospital containing well-equipped laboratory where excellent opportunities exist for gaining extensive experience.

Applications should be sent immediately to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT SENIOR HOUSE OFFICER in Anæsthetics required from mid-February, 1955. Post recognised for F.F.A.R.C.S. Excellent opportunities exist at this Hospital for gaining tuition and experience in the administration of anæsthetics. The equipment is the most modern available.

Apply, giving full particulars, to Group Secretary, Oldchurch Hospital, as soon as possible.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER required in Neurosurgical Department. Post vacant from 3rd January, 1955. Suitable for candidates seeking higher medical or surgical qualifications. Recognised for the F.R.C.S. (Eng.).

Apply to Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, as soon as possible.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) ORTHOPÆDIC HOUSE SURGEON (resident) required in the Orthopædic and Accident Unit from 26th January, 1955. The service consists of 100 beds equally divided between traumatic surgery and "cold" orthopædics. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications to be sent to Group Secretary, Romford Hospital Management Committee, Oldchurch Hospital, as early as possible.

SULLY HOSPITAL, Sully, Penarth, Glamorganshire. (324 Beds.) THORACIC CENTRE. CARDIFF HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (medical) required to commence 1st March, 1955. Experience gained in investigation and treatment of lung and heart conditions.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the appointment of RESIDENT HOUSE SURGEON for a period of 6 months from 6th March, 1955. The post is open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/HOUSE PHYSICIAN to run consecutively in this order from 6th February, 1955, for a period of 6 months in each post. The post is open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. E.N.T. Surgery. DUNDEE ROYAL INFIRMARY. Applications are invited for the post of REGISTRAR in the Regional establishment based at Dundee Royal Infirmary, a Teaching Hospital of 510 Beds associated with the University of St. Andrews. Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application may be obtained from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 15th January, 1955.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR in E.N.T. Surgery in the Edinburgh Northern Group of hospitals. The appointment is subject to the terms and conditions of the National Health Service.

Applications, giving particulars of age, qualifications and previous experience, together with the names of 3 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 22nd January, 1955.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment of a SENIOR REGISTRAR in Ophthalmology to the Royal Infirmary of Edinburgh. This post has been created in view of the establishment of a Professorial Unit in Ophthalmology, but the person appointed may be required to spend part of his period of training in the non-professorial department. The post is subject to the terms and conditions of the National Health Service.

Applications, giving particulars of age, qualifications, and previous experience, together with the names of 3 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 21st January, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the Western Regional Hospital Board for a SENIOR REGISTRAR in Virus Diseases at Ruchill Hospital Laboratories. The person appointed will work under the immediate direction of the Glasgow University Lecturer in Virus Diseases and in association with the University of Glasgow Departments of Bacteriology and of Infectious Diseases. Applicants need not have had experience in virus diseases, but a basic training in bacteriology or pathology will be essential. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 22nd January, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance :—

2 SENIOR REGISTRARS in Medicine, based at the Royal Infirmary, Glasgow.

SENIOR REGISTRAR in Psychiatry at the Southern General Hospital, Glasgow (Department of Psychological Medicine, University of Glasgow).

SENIOR REGISTRAR in Tuberculosis, based at Robroyston Hospital, Glasgow.

REGISTRAR in Medicine, based at the Royal Infirmary, Glasgow.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 22nd January, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance :—

SENIOR REGISTRAR in Surgery based at Stobhill Hospital with duties at the Royal Hospital for Sick Children, Glasgow. This is a transitional post tenable for 1 year and is offered to candidates who have completed 3 or more years of training as Senior Registrars.

SENIOR REGISTRAR in Surgery for joint duty at Law and Stonehouse Hospitals, Lanarkshire.

SENIOR REGISTRAR in Neurosurgery based at Killearn Hospital, near Glasgow.

SENIOR REGISTRAR in Bacteriology based at the Victoria Infirmary, Glasgow, with duties in Ayrshire and elsewhere within the Region as may be required.

REGISTRAR in Pathology based at the Royal Infirmary, Glasgow, which may involve duties in the Lanark County Area.

REGISTRAR in Orthopædics, Stirling and Clackmannan Hospitals.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 22nd January, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in E.N.T. Surgery based at Stobhill Hospital and the E.N.T. Hospital, Glasgow, which will be for 1 year in the first instance. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 22nd January, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in Ophthalmology, based at the Eye Infirmary, Glasgow, which will be for 1 year in the first instance. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 22nd January, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in Obstetrics and Gynæcology based at the Eastern District Hospital, Glasgow, which will be for 1 year in the first instance. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 22nd January, 1955.

SALFORD, 6. HOPE HOSPITAL. Salford Hospital MANAGEMENT COMMITTEE. HOUSE SURGEONS required at the above Hospital for the period 27th January, 1955–26th July, 1955. These posts are open to pre-registration or post-registration candidates.

Applications, stating age, qualifications, &c., together with the names and addresses of 2 referees, should be forwarded to the Hospital Secretary as soon as possible.

SHEFFIELD NATIONAL CENTRE FOR RADIOTHERAPY. SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT REGISTRAR (radiotherapy) required. Post becomes vacant on 1st March, 1955. Candidates should be in possession of Part I of D.M.R.(T.). The post offers excellent opportunities for research and great experience would be gained. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 10th January, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL HOSPITAL UNIT. Applications invited for the non-resident post of REGISTRAR in E.N.T. Surgery at the above Hospital.

Applications, stating age, qualifications, and experience, with the names of 3 referees, should be sent immediately to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

SHREWSBURY. EYE, EAR AND THROAT HOSPITAL. (70 Beds.) SENIOR HOUSE OFFICER (ophthalmic). Eye Unit 35 Beds. Post recognised for the D.O. Vacant 1st January, 1955.

Applications, with copy testimonials, to Group Secretary, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) HOUSE PHYSICIAN, for Pre-registration Service, vacant 1st January, 1955.

Applications, with copy testimonials, to Group Secretary, Royal Salop Infirmary, Shrewsbury.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum HOUSE OFFICER (casualty) required, 1 of 2, for busy Casualty Department.

Applications, stating age, qualifications, with names of 2 referees, to Hospital Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. SENIOR HOUSE OFFICER (casualty) required, 1 of 2, for busy department. Post vacant 3rd January. Experience provided in orthopædic and plastic cases.

Applications, stating age and qualifications with 2 testimonials, to Hospital Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum SENIOR HOUSE OFFICER (casualty), 1 of 2, required for post vacant 3rd January.

Apply Hospital Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. SENIOR HOUSE OFFICER (medical) required for post vacant 1st February.

Applications, stating age and qualifications, with 2 testimonials, to Hospital Secretary before 14th January.

SOUTHAMPTON CHEST HOSPITAL. South West METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR required immediately for Thoracic Unit (80 surgical beds) at above Hospital. Candidates should possess higher qualifications and should have had previous experience of thoracic surgery. The Hospital may be visited, if desired, by prior arrangement.

Application forms may be obtained from the undersigned, to whom they should be returned, when completed, by 15th January, 1955.

FRANK JENNINGS, Group Secretary,
Southampton Group Hospital Management Committee.
Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) CASUALTY OFFICER/SENIOR HOUSE OFFICER (orthopædic). Required for the above Hospital (Orthopædic Unit 74 Beds) in January. This Hospital is the centre to which all trauma from a large industrial town and port is directed, thus providing excellent experience in the treatment of traumatic conditions.

Applications, with copies of testimonials, to be submitted as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time SENIOR REGISTRAR in Chest Diseases to fill a vacancy in the approved trainee establishment at the Dartford Group of hospitals, for duty mainly at The Bow Arrow Hospital, Dartford, Kent, which is a unit of 116 beds devoted to assessment and early treatment of tuberculosis including primary tuberculosis in children, and also at Chest Clinics in the area. Candidates must have had wide experience in general medicine and in the diagnosis and treatment of pulmonary tuberculosis. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 3 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 15th January, 1955.

SWINDON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. VICTORIA HOSPITAL, SWINDON. Applications invited for post of RESIDENT SENIOR HOUSE OFFICER (anæsthetics) for the Swindon hospitals. Post is recognised for the D.A. Approved salary, conditions, &c.

Apply, with copies of 3 recent testimonials, to Secretary, 7, Okus-road, Swindon.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (medical) required. Post vacant 12th January. Recognised for pre-registration experience.

Applications, with copy testimonials, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent, as soon as possible.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (general surgery) required, vacant shortly. Hospital recognised for F.R.C.S. examination, and post recognised for pre-registration.

Apply, with copy testimonials, stating age, nationality and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (pædiatrics) required. Recognised pre-registration post vacant January.

Detailed applications, with copy testimonials, should be forwarded to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent, as soon as possible.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. SENIOR HOUSE OFFICER in Obstetrics and Gynæcology required. This is a new post and recognition for M.R.C.O.G. and D.Obst.R.C.O.G. has been applied for (2 House Officer posts already recognised).

Applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent, as soon as possible.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE SURGEON (House Officer grade) required for 1 of the 2 general surgical teams. Recognised for the F.R.C.S. Post vacant about 17th January, 1955, and tenable for 6 months. Preference given to candidates seeking pre-registration posts under the Medical Act, 1950.

Applications to the Group Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

STOCKPORT INFIRMARY. (163 Beds.) Applications are invited for 3 HOUSE SURGEON (pre-registration) posts. General Surgery and Ophthalmology (recognised for the F.R.C.S. and D.O.M.S.); General Surgery and E.N.T. (recognised for the F.R.C.S. and D.L.O.); General Surgery and Gynæcology (recognised for the F.R.C.S.). All posts vacant mid-January.

Applications, stating age, qualifications, and experience, together with copies of 2 testimonials, to be addressed to the Group Secretary, 59B, Shaw-heath, Stockport, Cheshire.

SUTTON. BELMONT HOSPITAL. St. Ebba's and BELMONT GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for appointment as PSYCHIATRIC REGISTRAR at above Hospital which is principally concerned with the treatment of neuroses and the early psychoses. There are ample opportunities for research and the Hospital, which is recognised for the D.P.M., takes an active part in teaching in association with teaching hospitals. Candidates may visit the Hospital by appointment with the Physician-Superintendent.

Application forms may be obtained from the Group Secretary, Group Office, Belmont Hospital, Brighton-road, Sutton, Surrey, and completed forms (5 copies) should be returned to him within 2 weeks of the appearance of this advertisement.

WARE PARK HOSPITAL, Ware, Hertfordshire. (129 Beds—Pulmonary Tuberculosis.) SENIOR HOUSE OFFICER (pulmonary tuberculosis) required early January. Resident.

Applications to Secretary, Hertford Hospital Management Committee, Hertford County Hospital, Hertford (Tel.: Hertford 2275).

WARRINGTON GENERAL HOSPITAL. (368 Beds.) Applications are invited from persons experienced in anæsthetics for the post of RESIDENT ANÆSTHETIST (Male or Female) graded as Senior House Officer. The Hospital is recognised for the D.A. examination. Salary is £745 p.a., less a deduction of £130 p.a. for residential emoluments.

Applications, stating qualifications and experience should be sent to— H. L. BOOT, Group Secretary,

Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WARRINGTON GENERAL HOSPITAL. (368 Beds.) Applications are invited for RESIDENT HOUSE PHYSICIAN (Male or Female), recognised for pre-registration. National Health Service terms and conditions. The appointment offers a wide and comprehensive experience in general medicine, including acute medical, paediatric, and infectious diseases. Staffing of the Medical Unit consists of a Registrar, Paediatric Senior House Officer, and 2 House Physicians.

Applications should be forwarded to—
H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WARRINGTON GENERAL HOSPITAL. (368 Beds.) Applications are invited for the post of HOUSE SURGEON (Male or Female) at the above Hospital, recognised for pre-registration. National Health Service terms and conditions. The staffing of the Surgical Unit consists of a Senior Registrar, Registrar, and 2 House Surgeons. The post offers a comprehensive training in surgery.

Apply, giving full particulars, to—
H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WARRINGTON INFIRMARY. Applications are invited from qualified practitioners for the vacancy of RESIDENT ANÆSTHETIST (Senior House Officer grade), Male or Female, at the Warrington Infirmary. The Infirmary is recognised for the D.A. examination. Scale of salary £745 p.a., less £130 p.a. for residential emoluments.

Applications to—
H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WEST DORSET GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of ANÆSTHETIC REGISTRAR to the West Dorset Group of hospitals. This is a new appointment, and tenable for 12 months in the first instance, but subject to review.

Application form, which must be returned by 10th January, 1955, may be obtained from Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset.

WARWICK GENERAL HOSPITAL. (350 Beds.) House SURGEON, pre-registration or registered candidates may apply. Resident. Accommodation available for married officer. Vacant end of January, 1955. Good experience in general surgery.

Applications, with 2 testimonials, to be forwarded to Medical Superintendent.

WARWICK HOSPITAL. (350 Beds.) Senior House OFFICER (anæsthetics) for duties mainly at the above Hospital. The post is vacant, recognised for D.A. and F.F.A.R.C.S.

Applications, with names and addresses of 3 referees, to be sent to Group Secretary, 50, Holly-walk, Leamington Spa.

WATFORD AND DISTRICT PEACE MEMORIAL HOSPITAL, WATFORD, HERTS. (198 Beds.) Applications are invited for the pre-registration post of HOUSE PHYSICIAN at this Hospital. Salary according to the National Health Service scale.

Applications, giving names of 2 referees, to be addressed to—
CYRIL HOPKINSON, Administrator.

WOLVERHAMPTON GROUP.

The Royal Hospital, Wolverhampton (An Associated Hospital of the University of Birmingham Medical School)
*3 HOUSE OFFICERS (general surgery), vacant early January.
HOUSE OFFICER (Ear, Throat, and Nose Department), vacant now.

Women's Hospital, Wolverhampton
*HOUSE OFFICER (gynæcological and obstetric). Appointment recognised for M.R.C.O.G. Vacant 5th February.

* Approved for Pre-registration Service.

Applications, with copies of 3 recent testimonials, to be sent to Group Secretary. The Royal Hospital, Wolverhampton.

WOODFORD BRIDGE, WOODFORD GREEN, ESSEX. CLAYBURY HOSPITAL (for nervous and mental disorders). Applications are invited for the post of Full-time SENIOR HOUSE OFFICER (resident or non-resident). Board-residence for an unmarried applicant, for which a charge of £150 p.a. will be made, is available. The Hospital has over 2000 Beds and an admission-rate of over 1000 a year. All forms of treatment are undertaken and outpatients clinics at general hospitals are run by the Hospital staff. Clinical conferences and seminars for the D.P.M. candidates are held weekly and facilities will be offered to attend lectures in London (1 hours journey). Previous general but not psychiatric experience necessary.

Applications, with full particulars and the names and addresses of 2 referees, to be sent to Physician-Superintendent not later than 14 days after the appearance of this advertisement.

WOODFORD GREEN, ESSEX. HARTS HOSPITAL. (100 Beds.) HOUSE OFFICER required, post vacant 26th January, 1955. The Hospital is a modern sanatorium with a Thoracic Surgical Unit and area chest clinic. The post offers exceptional opportunity for gaining experience in tuberculosis and diseases of the chest. The Hospital is close to the underground railway and within easy reach of Central London.

Applications, with copy of a recent testimonial, should be sent to the Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WORTHING HOSPITAL, Lyndhurst-road, Worthing, SUSSEX. WORTHING GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SURGICAL HOUSE OFFICER (Senior House Officer grade), vacant February, 1955. The post is recognised for the revised Fellowship regulations in respect of the 6 months training required by candidates for the Final Fellowship examination.

Applications, stating age, qualifications, nationality, and experience, together with copies of 2 recent testimonials, to be forwarded to the Hospital Secretary as soon as possible.

A. V. OAKTON, Group Secretary.

BALTIMORE, MARYLAND, U.S.A. FRANKLIN SQUARE HOSPITAL. ROTATING INTERNSHIPS available. Fully approved, Council on Medical Education, American Medical Association.

Applications to Franklin Square Hospital, Baltimore 23, Md., U.S.A.

Public Appointments

ANTRIM COUNTY HEALTH COMMITTEE. Northern IRELAND. Applications are invited for the whole-time post of ASSISTANT MEDICAL OFFICER. Applicants must be registered medical practitioners holding a Diploma in Sanitary Science, Public Health or State Medicine, and must be qualified in accordance with the Qualifications and Duties of Medical Officers' Regulations, S.R.&O.(N.I.), 1948, No. 26. Duties will be mainly in the South of the County in connection with the Maternity and Child Welfare Service, Schools Medical Service, and other general health functions under the direction of the County Medical Officer. Salary (in the scale £950–£50–£1300 p.a. The post is subject to the Local Government Superannuation Act (N.I.), 1950. Regulations have provided for credit to be given within the Northern Ireland scheme for service reckonable under approved superannuation schemes in Great Britain. The person appointed will be expected to provide a car for official duty, and will be granted a travelling allowance in accordance with the scale in force for the time being. It is the Committee's policy to give special consideration to applicants who have served in Her Majesty's Forces.

Application forms and full particulars may be obtained from the Secretary at Rosstulla, Jordanstown, Whiteabbey, Belfast. Applications must be lodged with the Secretary before NOON on Monday, 24th January, 1955.

BAHRAIN, PERSIAN GULF. GOVERNMENT OF BAHRAIN MEDICAL DEPARTMENT invites applications from British Male doctors for the post of ANÆSTHETIST. Age 28–33. D.A. qualification essential. Preference given to those who can combine this with other medical duties. Minimum salary £1697, rising £45 annually, no allowances. Private practice among Europeans only. No income-tax. Free quarters with hard furniture and car. Agreement for 2 years, renewable, with 5 months home leave on full pay and free air passage every 2 years for doctor and wife, but not family.

Applications, showing candidates career, age, family responsibilities, 3 testimonials and photograph, should be sent to the C.M.O., Bahrain Government Hospital, Bahrain, Persian Gulf.

FLINTSHIRE COUNTY COUNCIL. (Population 145,100.) Applications are invited for the appointment of DEPUTY MEDICAL OFFICER OF HEALTH (Male), from duly qualified and registered medical practitioners holding the Diploma in Public Health or similar qualification. Salary £1450 p.a., rising by annual increments of £50 to £1700 p.a., plus a car allowance. The appointment is superannuable and the successful candidate will be required to satisfy a medical examination.

Form of application and further particulars can be obtained from the undersigned and applications should be returned not later than 25th January, 1955.

W. HUGH JONES, Clerk of the County Council.

County Buildings, Mold.

GLOUCESTERSHIRE COUNTY COUNCIL. Applications are invited for the appointment of ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH (Male). Salary in accordance with the Whitley Council for the Health Services, Medical Council, £950 p.a. rising by £50 to £1300 p.a. Commencing salary will be determined on previous experience. Applicants must be registered medical practitioners and possession of a Diploma or Certificate in Public Health would be an advantage. The post is superannuable and is subject to a medical examination. Must be able to drive and possess a motor-car ; travelling and subsistence allowances in accordance with the County scale.

Forms of application with particulars of duties and conditions of appointment may be obtained from the County Medical Officer of Health, Berkeley House, Berkeley-street, Gloucester, to whom completed applications should be sent not later than 14th January, 1955.

GUY H. DAVIS, Clerk of the County Council.

Shire Hall, Gloucester.

GOVERNMENT TRAINING CENTRE AND INDUSTRIAL REHABILITATION UNIT, Vassall-road, FISHPONDS, BRISTOL. Registered medical practitioner required for part-time appointment as MEDICAL OFFICER at above Centre. Duties include general medical supervision of persons undergoing courses of training and rehabilitation including supervision of first-aid arrangements, &c. Attendance required for up to 6 sessions per week, varying according to number of persons undergoing training or rehabilitation. Fees vary according to length of session from £1 for ½ hour to £2 15s. for maximum session not exceeding 3 hours. A mileage allowance is payable in certain circumstances. Preference will be given to candidate with experience in industrial medicine and rehabilitation ; and the post offers excellent opportunities for experience and research in this field.

Write in duplicate stating age, full details of qualifications and experience, with dates and periods of service (if any) with Forces, to B.Y.1293, Appointments Officer, Ministry of Labour and National Service, 1–6, Tavistock-square, W.C.1, by 10th January, 1955. No original testimonials should be sent.

IPSWICH. COUNTY BOROUGH OF IPSWICH. Appointment of ASSISTANT MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER. Salary scale £950–£50–£1300. Commencing salary may be determined having regard to the previous local authority service of the successful candidate, and possession of the D.P.H. will be an advantage.

Application forms and conditions of service will be forwarded on application to the Medical Officer of Health, Elm-street, Ipswich.

Town Hall, Ipswich. J. C. NELSON, Town Clerk.

NOTTINGHAMSHIRE COUNTY COUNCIL. PUBLIC HEALTH DEPARTMENT. Appointment of Medical Officers. Applications invited from registered medical practitioners (either sex) for either of the following whole-time appointments :—

SENIOR CLINICAL MEDICAL OFFICER :

Salary within the scale £1150–£50–£1400, subject to a maximum commencing salary of £1300 p.a.

Applicants should :—

(*a*) Possess the D.P.H., D.C.H., or comparable qualification.

(*b*) Have had at least 3 years experience as whole-time Clinical Medical Officer in the Ante-Natal, Child Welfare, and School Health Services of a Local Authority since July, 1948.

(*c*) Have been approved by Ministry of Education for, and have had substantial experience in, the ascertainment of educationally subnormal children.

ASSISTANT COUNTY MEDICAL OFFICER :

Salary £950–£50–£1300, or if holding a Diploma in Public Health £1100–£50–£1300.

Application forms and conditions of appointment from the County Medical Officer, County Hall, Trent Bridge, Nottingham. Applications by 31st January, 1955.

A. R. DAVIS, Clerk of the County Council.

FURTHER ADVERTISEMENT

YORKSHIRE. NORTH RIDING COUNTY COUNCIL. Applications are invited from suitably qualified medical practitioners for the whole-time mixed appointment of MEDICAL OFFICER OF HEALTH for the Borough of Thornaby-on-Tees and the Rural District of Stokesley and ASSISTANT COUNTY MEDICAL OFFICER. The salary will be within the range of £1379 4s. 4d. and £1727 5s. 6d. calculated on the following scales : 4/11ths as Medical Officer of Health £1550–£50–£1750 ; 4/11ths as Assistant County Medical Officer £1428 11s. 6d.–£57 2s. 10d.–£1885 14s. 2d. ; 3/11ths as School Medical Officer £1085 14s. 4d.–£57 2s. 10d.–£1485 14s. 2d. The position in the several scales will be decided according to the service and experience of the successful applicant. Conditions of service in accordance with Whitley Council's recommendations (Medical Council Committee "C"). Housing accommodation will be made available.

Application forms and further particulars obtainable from the undersigned to be returned not later than 14th January, 1955. Canvassing will disqualify.

H. G. THORNLEY, Clerk of the County Council.

County Hall, Northallerton, 17th December, 1954.

NORFOLK. COUNTY OF NORFOLK. The Norfolk County Council and the County District Councils concerned invite applications from registered medical practitioners holding the Diploma in Public Health for the whole-time appointment of ASSISTANT COUNTY MEDICAL OFFICER AND DISTRICT MEDICAL OFFICER OF HEALTH for the undermentioned area :—

Area No. 7

Downham Urban District.
Downham Rural District.
Marshland Rural District.

Apportionment of duties :—

Assistant County Medical Officer—7/11ths.
District Medical Officer of Health—4/11ths.

Combined salary scale £1363–£1618. Travelling and subsistence expenses will be paid in accordance with the County Council's scales. The person appointed will act as Assistant County Medical Officer under the direction of the County Medical Officer and as District Medical Officer of Health he will be subject to the instructions of the District Councils concerned.

Application forms, together with further particulars of the appointment, can be obtained from the County Medical Officer, 29, Thorpe-road, Norwich, to whom completed forms should be returned not later than 19th January, 1955.

General Practice

For an Executive Council post (England and Wales) apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."

FILKINS, LECHLADE, GLOS. DISTRICT. Applications invited for VACANCY (rural and dispensing). List approximately 1850. Residence and surgery may be available. Apply, on Form E.C.16A, before 10th January, 1955, to—

V. R. PARRY, Clerk,
Oxford County and City Executive Council.

73, George-street, Oxford.

Hospital Services : Non-Medical Appointments

ROYAL NORTHERN HOSPITAL, Holloway-road, London, N.7. BIOCHEMIST (Principal grade) required for Northern Group Hospital Pathological Services. Salary scale £1125, rising by annual increments of £50 to £1375, plus £50 London weighting.

Application forms obtainable from Hospital Secretary.

ST. ALBANS, HERTFORDSHIRE. HILL END HOSPITAL. BIOCHEMIST (non-medical), University Graduate, required for duties in the Pathological Department at the above Hospital. The successful candidate should have had at least 2 years experience in a hospital laboratory, but consideration will be given to recently qualified candidates. Duties consist of routine and more advanced bio-chemical techniques and research experience will be an advantage. Salary and conditions of service according to Whitley Council.

Applications to the Consultant Pathologist.

Miscellaneous

To non-professional posts the Notification of Vacancies Order 1952 applies.

Applications are invited from registered medical practitioners for the post of part-time Medical Officer to the Avonmouth mill of The British Oil and Cake Mills Ltd. Amount of time to be spent in the mill will be 6 hours per week. Salary £450 p.a. The successful candidate will be required to undertake all the duties of an industrial medical officer at the mill. Candidates, who should preferably be within the age-group 29–42, should have attained a high standard of ability in clinical medicine and this should be combined with interest in and experience of preventive and/or industrial medicine.

Applications, giving full details of age, qualifications, training, and experience, accompanied by the names of 3 people from whom references can be obtained, should be submitted not later than 29th January to the Principal Medical Officer, UNILEVER LIMITED, Unilever House, Blackfriars, London, E.C.4.

Ship's Surgeon required for cableship based on Rio-de-Janeiro. Commission 18 months with option extension. Salary £940 plus overseas allowance £132 p.a. Leave accrues at rate of 5 days per month served overseas.—Apply, in writing, Staff Manager, CABLE AND WIRELESS LTD., Electra House, Victoria-embankment, London, W.C.2.

Medical Supply Company (New Cavendish-street, London) requires a part-time Organiser for Sales Department for branded product. Small Investment.—Apply : Address, No. 992, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Wimpole-street, W.1, just off Oxford-street, first-floor 2 rooms, rent £400 p.a., inclusive, suitable for office or professional purposes. Central heating, electric lift, caretaker on premises.—Address, No. 993, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Manchester. Premises at end of St. John-street comprising 3 ground-floor offices, 2 first-floor offices, 2 second-floor offices. Total floor area 1260 square feet. Very suitable indeed for a group of specialists who are prepared to share this self-contained and compact accommodation. Rent £450 p.a. R.V. £138.—W. H. SUTTON & SONS, 60, Spring-gardens, Manchester, 2.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE, LTD., 98, Victoria-street, S.W.1 (Phone : VICtoria 0141), who are specialists in this kind of work.

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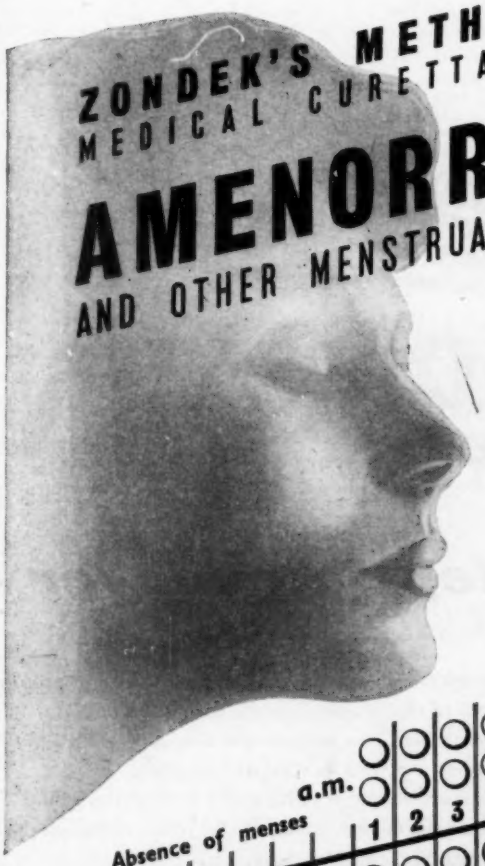
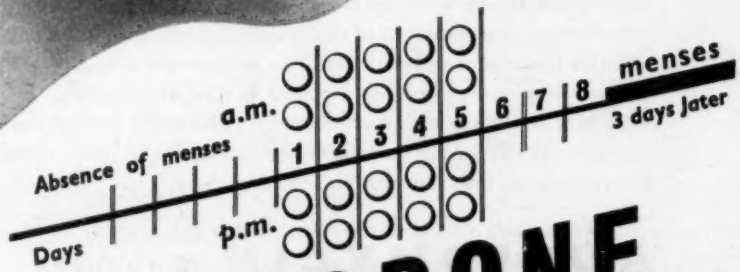
ZONDEK'S METHOD
MEDICAL CURETTAGE

AMENORRHOEA
AND OTHER MENSTRUAL DISORDERS



4
TABLETS
DAILY
FOR
5 DAYS



AMENORONE

Each Tablet contains Ethisterone 10 mg. Ethinyl Oestradiol 0.01 mg.
Box of 20 Tablets intended for a 5-day course
BASIC N.H.S. COST 9/6

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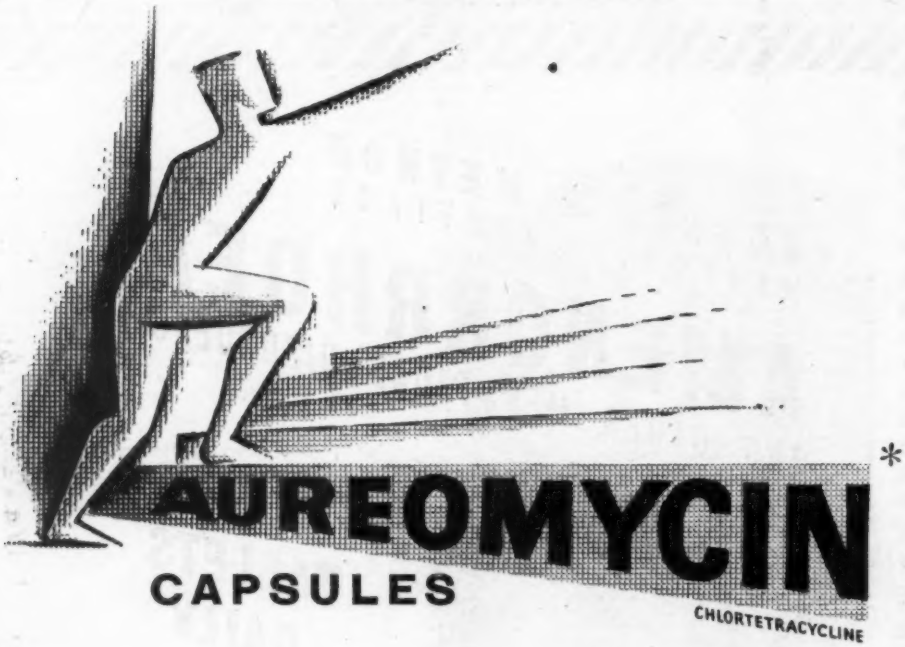

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